Sassafras Natural Resources Management Area
Land Unit Plan

Approved
July 16, 2002

Maryland Department of Natural Resources
Resource Planning Program

Acknowledgements

A number of agencies and individuals made significant contributions in the development of the land unit plan for Sassafras Natural Resources Management Area. The Department of Natural Resources particularly appreciates the efforts of the Citizens Advisory Committee who contributed their time and effort in reviewing and providing input on the plan.

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Sassafras Natural Resources Management Area Land Unit Plan

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Executive Summary

THE SITE AND ITS REGIONAL SETTING

Sassafras Natural Resources Management Area (NRMA), located in northern Kent County, is a 991-acre complex of rolling woodland, agricultural land and wetlands. Given its almost 3 miles of shoreline along the Sassafras River and Turner's Creek and a variety of habitat types, Sassafras supports a diversity of flora and fauna. Acquired by the State in 1995 with Program Open Space funds and widespread public support, the site conserves important natural and historic resources and provides opportunities for public recreation and education in an area where such a facility was lacking.

Sassafras NRMA is managed by the State Forest and Park Service, as part of the Tuckahoe State Park complex, on the Eastern Shore. It is managed to conserve, protect and enhance existing wildlife habitat, fisheries, and other natural resources. The NRMA currently offers a variety of low-impact recreational opportunities such as hiking, bicycling, horseback riding, nature study, hunting, fishing, and limited group camping, but there are no facilities for the public.

THE LAND UNIT PLAN

The approved land unit plan is the result of a process that includes input from resource professionals within the Department of Natural Resources (DNR), a Citizen Advisory Committee, local government officials, and the public. Initially, an evaluation of the site's existing conditions and potential for resource protection and public use was conducted. Based on this information, an interim concept plan for Sassafras was developed and presented to the public for review and comment at a Public Meeting held in 1996. Subsequent to this review, additional resource information as well as management recommendations were collected from an interdisciplinary team of resource professionals, including a fisheries biologist, a wildlife biologist, a Heritage ecologist, a forester and the land manager (refer to Existing Conditions Map #2). Based on this input, a draft land unit plan was completed and circulated for review by DNR and the Citizen Advisory Committee. The draft plan was also presented to the public for review at a meeting held on April 8, 2002. Comments were received at the public meeting as well as the following 30-day public comment period (which closed May 8, 2002). The final draft plan was completed with input received from the public and forwarded to the Secretary of DNR who approved the Plan on July 16, 2002.

The land unit plan offers a comprehensive set of goals and recommendations for management of natural and cultural resources and for education and recreational use of the site. It includes a concept plan (refer to Land Unit Concept Plan Map #6) that identifies three broad use areas based on underlying resources and the primary activities appropriate to each area. The site plan emphasizes conservation of natural habitats and proposes limited day use and educational facilities.

MANAGEMENT GOALS

The broad management goal for Sassafras NRMA is

> *…to implement land management practices which protect, promote, and enhance the site's natural and cultural resources, and to integrate compatible facilities and programs for recreation and education into this framework.*

To achieve this major goal, the planning team developed specific goals for resource management, education, and recreation, which are summarized below. These desired conditions will be achieved through annual work plans developed and implemented by the land manager in coordination with resource professionals at DNR and community partners.

Wildlife Conservation
Goal: Conserve and enhance the habitat essential to maintain viable populations of wildlife species native to the area and to ensure their perpetuation as viable components of their ecosystems.

Fisheries Conservation
Goal: Manage the site and its visitors in a manner that contributes to water quality and the health of tidal fisheries, and develop a stable recreational freshwater fishery that enhances water quality and wetlands.

Conservation of Rare Species and Other Sensitive Natural and Cultural Resources
Goal: Conserve and protect rare species and their habitats, erodible soils, steep slopes, streams, wetlands, shorelines, natural materials, historic structures, and cultural artifacts.

Maintenance Of Natural Processes
Goal: Protect and restore the natural geological, hydrological and ecological functions and processes at Sassafras NRMA.

Forestry And Other Vegetation Management
Goal: Manage vegetation at Sassafras in a manner that conserves forests, provides habitat for native plant and animal species, reduces the abundance and impact of invasive and non-native species, and enhances ecological functioning.

Agriculture / Soil And Water Conservation
Goal: Manage agriculture in a manner that minimizes soil erosion and the runoff of nutrients, pesticides and other chemicals from the land, benefits wildlife, and provides revenue if needed for the operation of Sassafras NRMA.

Recreation And Education
Goal: Provide diverse and high quality natural resource-based education and recreation opportunities for the public, consistent with resource protection and management goals.

SITE PLAN

The site plan emphasizes the retention of forest, the conservation of natural habitats, the enhancement of wildlife and fisheries habitat, and provides opportunities for the public to enjoy and learn about these natural resources. Limited day use facilities are proposed, including two picnic pavilions with attached rest rooms and the renovation of an existing historic home (used in the past as a private hunting lodge) to serve as a nature center. The plan delineates three broad areas within the site and suggests appropriate conservation and public use activities for each. These areas are as follows:

Day Use Area

The northern portion of the site along the Sassafras River will be developed into the Day Use area. Near the western boundary of the Day Use Area, the historic home overlooking the Sassafras River will be renovated into a nature education facility with exhibit space, offices and a meeting room. A fence will keep visitors a safe distance from steep, eroding bluffs. On a field adjacent to the nature facility, the plan proposes two picnic shelters with attached restrooms, a modest parking lot, and a handicapped accessible trail.

From the lodge, gently sloping terraces lead eastward down to the tidal marsh. These terraces will be planted with native grasses to provide wildlife habitat and preserve scenic views. An observation tower may be built to provide a birds-eye view of the tidal marsh. Improved trails will provide opportunities for hiking, nature observation, hunting and fishing access. A trail will guide visitors east along the woodland border to a level access point along the shoreline.

Natural Area

The eastern portion of the NRMA contains a concentration of sensitive elements and is identified in the plan as a permanent natural area. The Natural Area extends from the southern edge of the tidal pond to the southernmost ravine on the site. The primary emphasis in the Natural Area will be the protection of sensitive features and the undeveloped landscape. Visitors will be allowed to enjoy the natural character of the area without any major facilities to alter the picturesque landscape. In the long term, an expansion of the forest is envisioned, which will create a contiguous forest of 100 or more acres in order to increase the amount of native forest and habitat for forest interior dwelling species.

Multi-use Area

The southwestern side of the NRMA is designated as a Multi-use Area. The northern portion of the multi-use area is a flat plateau that offers majestic views across the land and water beyond and ends abruptly at the top of a tall cliff on the Sassafras River. Steep forested ravines border the plateau. Recently planted forested buffers will expand the forest over time; warm season grasslands and native wildflower meadows will provide upland wildlife habitat and soften the transition from field to forest. Hiking, hunting, fishing, agriculture, and wildlife management and appreciation will be the primary activities in this part of the multi-use area. The multi-use area is bisected by the NRMA entrance road, where a new entrance gate and parking area will be built. A paved walking

trail to the new freshwater pond will be created west of the entrance road to provide access for people with disabilities. Farther south, the current farm fields will eventually be managed as a complex of agriculture and mowed fields, with buffer areas planted in warm season grasses and native wildflowers. The mowed areas may be used for the occasional group activities that require good access and open space but no permanent support facilities.

Proposed Facilities

The limited facility development at Sassafras will occur in phases. At present, only Phase I capital improvements have been approved for funding. Phase II improvements will be submitted in the near future, but there is no guarantee when the Phase II facilities will be built.

Phase I

The first phase of improvements for Sassafras NRMA has been approved under the State's Capital Budget program and consists of construction and restoration of the current road from the NRMA entrance to the historic lodge. Also included are a 15-car gravel parking lot and an entrance gate.

Phase II

The second phase of planned improvements will include the renovation of the historic lodge to serve as a public nature center, day use improvements, electrical service, and construction of a gravel access road, new wells, septic drainfield and tank. Planned day use facilities include two picnic shelters with attached restrooms, a gravel parking lot,

2 handicapped access paths, and possibly a small pier. As part of the proposed Phase II improvements, the renovated historic lodge will include spaces for displays, a classroom, a library, a conference room, offices and restrooms; and possibly living quarters for an on-site staff member.

Siting and construction schedules for all facilities at Sassafras NRMA will be planned to avoid impacts to sensitive areas and wildlife, and will be reviewed by an interdisciplinary team before implementation.

Additional recreational, educational, and safety improvements are recommended in the plan, such as a system of hiking trails, a possible wildlife observation tower, signs and a safety fence along the steep bluffs. Land managers will work cooperatively with the Nature Tourism Program and the interdisciplinary team to locate and obtain potential sources of grants and other funds to implement these and similar objectives.

INTRODUCTION

SITE DESCRIPTION

Sassafras Natural Resources Management Area (NRMA) is a 991-acre site located on the northern boundary of Kent County, Maryland, along the shores of the Sassafras River and Turner Creek (***Map 1: Location Map***). Formerly known as Bloomfield Farms, the property provides important habitat for waterfowl, wildlife and several rare species, as well as an historic building and archeological resources. It was acquired by the State in 1995 in order to protect and enhance the site's natural resources, to provide an important link in Maryland's network of public lands and open spaces, and to provide outdoor recreation and education opportunities on the upper Eastern Shore. Program Open Space funds were used to acquire the property, with the widespread support of interested citizens and Kent County officials.

The NRMA is largely undeveloped, with a varied terrain of rolling farmland, forests, and marshes and support a diverse array of plants and animals. Steep, wooded ravines dissect relatively flat farmland plateaus. From the level summit, undulating slopes lead down to diverse exposures along almost three miles of shoreline, including weather-battered cliffs, protected sand beaches, and tidal marsh. Rare plants grow along the shoreline, endangered tiger beetles inhabit eroding cliffs, and a pair of bald eagles nest at the edge of a forested slope. Agricultural field, old field, emergent marsh, tidal pond, sandy beach, young forests, and mature bottomland hardwood forests provide food and cover for many game and non-game wildlife species.

The NRMA provides an important addition to the outdoor recreational opportunities in the region by offering public access to forested natural areas and to the waters of the Chesapeake Bay. There are no State parks in this area of Kent County, and access to day use facilities for outdoor recreation in the area have been limited. The NRMA augments the adjacent county park and the boat ramp facility at Turner Creek by providing the general public with hiking trails and day use facilities. The waterfront site offers majestic views of the Sassafras River and the Chesapeake Bay beyond, and the forests, fields and shorelines beckon sportsmen and families alike to enjoy outdoor recreation in a natural setting. The site's varied habitats and its history offer diverse opportunities for outdoor education.

Four family farms occupied this land in decades past and at present agriculture remains the dominant land use of the site. The fields were (believed to be) planted with tobacco and orchards in colonial times. In the twentieth century, portions of the property were developed as ornamental gardens and used to cultivate plant nursery stock, as evidenced today by several large cultivated trees and remnant garden plantings. For a time, cattle were raised on the site.

Artifacts found in the area reveal prehistoric Native Americans to have been the first human colonizers of these shores, long before farmers tilled its fields. Now the site is slowly transforming once again, into a landscape where natural resources are carefully protected and restored, where people enjoy low impact outdoor recreation, and where modest day use and educational facilities will enhance their appreciation of the area's history, ecology, and beauty. Upon state acquisition of

the land, most of the farm buildings and homes on the site were found to be unstable and hazardous, and they were removed. However, one building was found to have historic significance and was retained and stabilized. Built in the Arts and Crafts “bungalow” architectural style, it is believed to have served originally as a vacation home or private hunting or fishing lodge. This historic building will be renovated to serve as a nature center, meeting room, and possibly staff office space, with care taken to preserve its historical features. Another historic state-owned structure, "Knock's Folly", is considered part of Sassafras but is actually located nearby on Turner Creek Road. These buildings complement the historic structures and wharf in the adjacent Turner Creek Park and the nearby Kent County Farm Museum, chronicling the European cultural transition of the landscape.

Sassafras NRMA is managed by the State Forest and Park Service as a part of the Tuckahoe State Park complex. At present the NRMA serves an estimated 10,000 visitors per year, providing a variety of recreational opportunities such as hiking, horseback riding, bicycling, nature study, hunting, and fishing. It is managed to conserve, protect and enhance existing wildlife habitat, fisheries, and other natural resources, and to provide low-impact recreation compatible with these conservation goals. Current access to the site is via a dirt road, and parking is limited to a small dirt lot at the NRMA's entrance.

This land unit plan offers a comprehensive set of goals and recommendations for continued conservation and enhancement of natural and cultural resources, and for compatible public use of the site for recreation and education. The plan proposes limited day use and educational facilities and improved public access to the site via a gravel road with two modest gravel parking areas.

MAP 1
Location Map
Sassafras NRMA
Resource Planning
Maryland Department of Natural Resources

Map Graphics by DNR - RP - wdl-03/13/02
File: Map 1 Location Map.mxd

THE PLANNING PROCESS

Purpose and Structure of the Land Unit Plan

This Land Unit Plan offers a vision of Sassafras NRMA for the next ten to fifteen years and beyond. The long-range plan responds to the site's intrinsic natural features and sets recommended direction for management of facilities and resources and the design of site improvements. The plan has three parts. *Existing Conditions* assesses underlying site conditions and analyzes site potential through a series of maps and text. The *Site Plan* establishes three major use areas and the conservation practices and public uses most amenable to each. *Goals and Recommendations* sets guidelines for effective resource management and public use of Sassafras NRMA.

Plan Development

The land unit plan is the result of a process that includes input from resource professionals within the Department of Natural Resources (DNR), a Citizen Advisory Committee, local government officials, and public input. Initially, an evaluation of the site's existing conditions and potential for resource protection and public use was conducted with input from an interdisciplinary team of resource professionals, including a fisheries biologist, wildlife biologist, natural heritage ecologist, forester and the land manager. Based on this information, an interim concept plan for Sassafras was developed and presented to the public for review and comment at a Public Meeting held in 1996. Subsequent to this review, additional resource information as well as management recommendations were collected from the team and input was also obtained as needed from botanists, a soil scientist, a geologist, an archeological historian, and two structural engineers. Based on this input, a land unit plan was completed and circulated for review by DNR and the Citizens Advisory Committee. A public review of the modified plan began with a meeting held on April 8, 2002. The 30-day public comment period ended on May 8, 2002. All comments received during the public meeting and the subsequent 30-day comment period are recorded in a separate document titled "Sassafras Natural Resources Management Area Land Unit Plan – Written and Spoken Comments from 30-day Public Review Period". The final draft plan reflecting public input was presented to the Secretary of DNR who approved the plan on July 16, 2002.

EXISTING CONDITIONS

The existing resources at Sassafras NRMA and the location of significant adjacent facilities are summarized in ***Map 2: Site Analysis - Existing Conditions***.

NATURAL RESOURCES

GEOLOGY

The geology of a region - the rock or sediment that underlies the soil surface - is significant because it influences topography and soil development, which in turn, in conjunction with climatic factors, determine the plant communities, wildlife species, and other life forms that inhabit a region. Geologic resources have affected human use of different regions of the earth throughout history, as materials have been extracted for use in tool-making, construction, or for important minerals they contain. Understanding the geology of a particular region also contributes to our general understanding of the origin, history and structure of the crust (the outer layer) of the earth itself.

The geological surface of the upland portion of Sassafras NRMA is composed of alluvial sands and gravels ("alluvial" refers to sediments deposited by flowing water). One theory of the origin of these sediments is that they were deposited as a broad terrace on the shores of an ancient sea during one of the interglacial stages of the Pleistocene (Glacial) epoch, approximately 11,000 to one million years ago. [1] Older references refer to these deposits as the Wicomico terrace or simply "upland alluvium". More recently the Maryland Geologic Survey places their origin in the Tertiary Period, somewhat less than 12 million years old, and refers to the formation as the "Pensauken". [2]

The steep, eroding cliffs along the shores of the Sassafras River cut through much earlier deposits known as the Mount Laurel Sand [3], which also is exposed in the marshes along Turner Creek. This unit was deposited late in the Cretaceous Period, approximately 70 to 80 million years ago. In earlier references portions of the Mount Laurel sands are called the Matawan and Monmouth formations.

Mount Laurel Sand is a thick unit of greensand (glauconitic quartz sand). Glauconite is an iron-containing mineral, usually greenish in color, which weathers to shades of brown and is used as a water softener and fertilizer. The formation also contains feldspar and the heavy minerals ilmenite, zircon and tourmaline, and others. Lignite (a low grade, brownish-black form of coal) is present mostly as small pieces less than an inch across. The cliffs along the Sassafras River offer probably the best exposures of the Mt. Laurel Formation anywhere in the northern Atlantic Coastal Plain.

The exposed cliffs provide a fascinating view of the underlying geology of the area in a way that cannot often be glimpsed elsewhere. Concretions of clay iron stone (siderite) are common in the

cliff material and can be examined where they land when material from the eroding cliffs slumps to the beach below. These concretions (masses) are unusual in that they are large and roughly cylindrical, some measuring more than a foot across and several feet long. Weathered marine fossils of the iron cast type are also common. Casts are fossils in which the original fossil dissolves out leaving a hollow that is filled in with another material, usually iron, that takes the shape of the original fossil. When weathering occurs, the fossil material is leached out, leaving molds coated by iron oxide.

Like the NRMA upland, the geologic surface of the tidal pond, tidal marsh and adjacent lowlands are part of one of the broad "steps" or terraces that cut into the surface of Maryland's Coastal Plain, in this case the Talbot terrace. The Talbot formation represents the lowest and youngest of the Coastal Plain terraces in the state. Ranging from 10 to 45 feet above current sea level, the Talbot terrace is widely developed on Maryland's Eastern Shore, where it forms the underlying geology of most of Worcester, Somerset and Dorchester Counties.

TOPOGRAPHY AND SHORELINE FEATURES

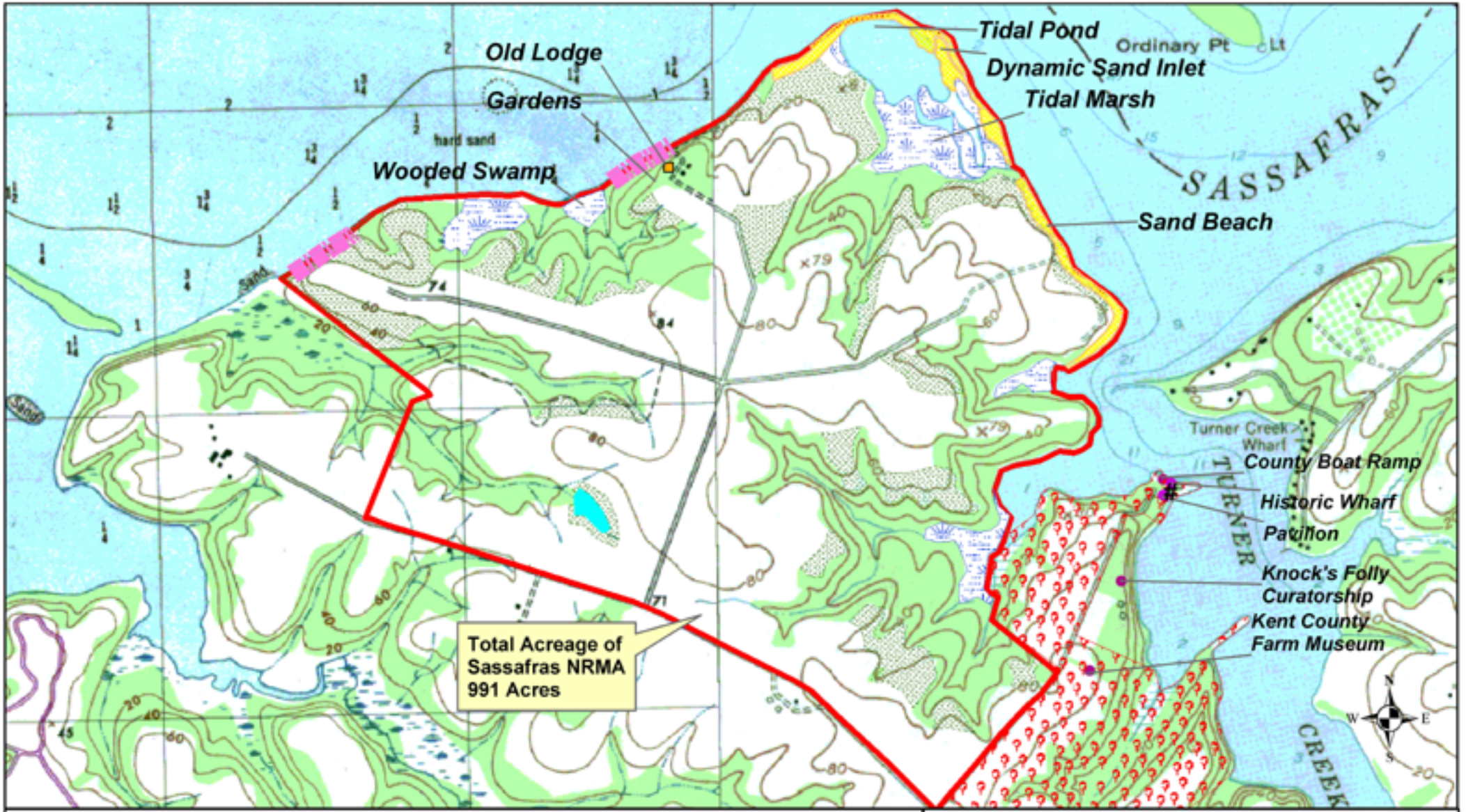
Topography

Much of the topography of Sassafras NRMA is generally fairly flat, with the exception of steep ravines and steep cliffs along parts of the shoreline. The highest elevations of Sassafras NRMA (approximately 100 ft.) are near the center of the site and form a sort of lobed plateau, the fingers of which stretch toward the Sassafras River and Turner Creek. Slopes in the central high ground are less than five percent. Toward Turner Creek the land slopes first gently, then in increasingly steep terraces with slopes up to about 15 percent. Steep ravines cut between the upland lobes, draining the higher ground. The ravines and terraces end at wetlands and beaches along the river and creek. Along the Sassafras River shoreline, two long sections of the upland end abruptly in sheer cliffs, 50 feet or more in height.

Shoreline

The shoreline along the Sassafras River and Turner Creek accounts for more than half of the boundary of Sassafras NRMA and offers a variety of experiences for the visitor and diverse plant and animal habitats. The shoreline is characterized by various formations of high bluffs (20' to 50') with steep, eroding faces, low areas of sediment deposition (tidal marsh), sandy beaches, and a large, well-developed sand spit and tidal pond and marsh complex. [4] The high banks (cliffs) on the northwest shore comprise of varying strata of sand, gravel, ironstone, silt, and clay. A considerable amount of sand and gravel exists in these banks, and is believed to be the source of material that is carried by currents and deposited to form the beach and sand spit on the northeast part of the NRMA.

Erosion of the generally high, unstable banks is caused by a number of forces, including wind, the freeze-thaw cycle, wave action against the toe of the banks, and overland flow of storm water.



Legend

- Kent County Park
- Existing Cliffs
- Fresh Water Pond
- Existing Sand Beaches
- Re-forestation
- Drainage
- Topographic Contours (ft.)
- Adjacent Significant Facilities
- Historic lodge
- Existing Marsh/Swamp
- Property Boundary

0 500 1,000 2,000 3,000 4,000 Feet

MAP 2
Site Analysis - Existing Conditions
Sassafras NRMA
Resource Planning
Maryland Department of Natural Resources

Map Graphics by DNR - RP - wdt-03/13/02
File: Map 2 SA Exist Cond.mxd

Average yearly erosion rates (shoreline recession) at the most actively eroding areas on the cliffs are estimated to range from approximately 0.9 to 1.4 feet of shoreline lost per year, based on a comparison of 1846 maps with aerial photography from 1953. [5]

Loss of soil due to wind and the freeze-thaw cycle is particularly severe along the very top of the banks. Soil is cut away just below the vegetation and roots. This could be potentially very dangerous for visitors hiking or seeking a view of the river. Most of these undercut areas are undetectable from the top of the bank. What appears to be solid ground may in some locations be a thin veneer of grass or tree litter over very little soil and 30 feet of air.

A second area of potential concern for visitor safety is the beach along the high banks. Trees are subject to sudden loss along much of the shoreline, potentially falling suddenly and without warning from the top of one of high banks down to the beach and water below. This danger would likely be greatest during high winds and after heavy storms. Other areas of the beach that are safer to walk along include the beaches fronting the marshes and the long sand spit that protects the tidal pond at the east end of the property.

The shoreline of Sassafras is apparently in a dynamic equilibrium. The spit and tidal pond complex remains relatively stable because the eroding banks are supplying sand and gravel to the littoral (shoreline) system. While the inlet location, beach height, width and vegetative cover may change from year to year, over the long term, as long as the banks continue to erode, the recession of the shoreline is likely to remain episodic and minor.

There are some areas where the shoreline is eroding that could potentially be stabilized without jeopardizing the habitat for the endangered Puritan Tiger Beetle or the balance of erosion and deposition that feeds the NRMA's beaches. The wetland located between the two cliff areas comprises a deep, well-developed marsh that is eroding along its channelward edge (along the Sassafras River). The high wooded point near the extreme easterly property boundary is also thought to be amenable to stabilization if necessary, without reducing deposition rates at other shoreline areas.

SOILS

Soils are important to the ecology of a region because, under the influence of climate, they dictate the vegetative communities that develop, which in turn affect the associated animal communities. Soil properties also affect the potential suitability of a given site for various human uses, such as agriculture, natural open spaces, active recreation, or development.

The soils of Maryland have been classified by the Maryland Office of Planning, into "natural soil groups" which group together soil types having similar major properties and features in order to help planners identify those areas best suited for various types of land use. [6] In ***Map 3: Site Analysis - Soils***, each natural soil group at Sassafras NRMA is delineated. In addition, the map legend indicates how each soil group is categorized in terms of the degree to which soil characteristics limit recreational development: slight limitations, moderate limitations, or severe limitations.

The soils of the ravine bottoms near the westernmost cliff and near Turner Creek are classified as G2, with severe limitations for all recreational uses due to wetness and flooding. Soils classified as B1c occur primarily on and adjacent to forested ravine slopes throughout the NRMA and also present severe limitations. The relatively steep slope of these soils limits recreational use except for paths and trails.

The B1b soils found on the gently rolling terrain between the tidal pond and the old lodge are classified as moderately limiting for many uses. However, recreational uses such as picnic areas or playgrounds can be accommodated on B1b soils with moderate grading and leveling, and their use for paths and trails is not limited at all. These soils also occur in the southern portion of the NRMA, in part of the headwaters of lower Turner Creek.

Soils classified as B1a and E3a are generally considered to have slight limitations to recreational use. Most of the level upland soils throughout the central "backbone" of the NRMA are classified as E3a. These soils are only slightly limited for picnic areas and trails, but moderately limited for campsites and intensive play areas. Frost heave limits the potential of E3a soils for paving. B1a soils, found between the tidal pond and Turner Creek along the Sassafras River, are considered excellent for most recreational uses.

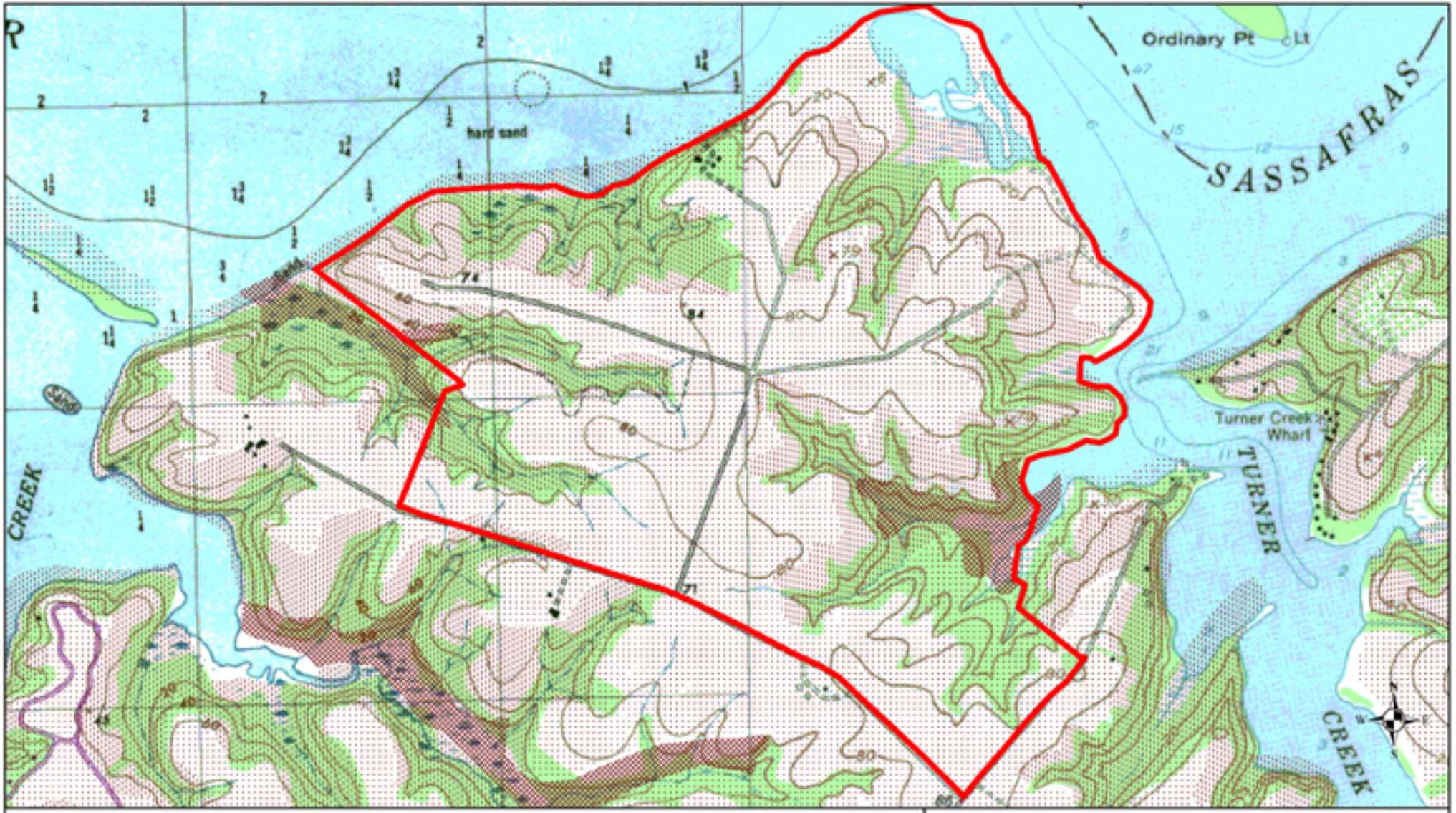
These are very general guidelines to soil types and their limiting factors. Siting of recreational features also takes into consideration the location of rare, threatened and endangered species habitats, wetlands, and other sensitive ecological and cultural features, as well as the recreational potential and goals for the land unit. In addition, final siting of recreational developments will require a site-specific analysis of soils and an assessment to verify the presence or absence of sensitive areas in the anticipated impact area, as well as project review by an interdisciplinary team of resource specialists.

For further information regarding the specific soil types at Sassafras NRMA as identified in the USDA *Soil Survey for Kent County*, please see Appendix I. [7]

VEGETATION

Forests

Although much of the central plateau at Sassafras NRMA has been farmed for many years, forests occur on and near much of the land in and adjacent to the ravines and along the Sassafras River and Turner Creek shorelines. A Forest Stewardship Plan written for Sassafras NRMA in 1995 identifies nine forested stands on the property, totaling 334 acres of trees. [8] Since then, approximately 90 acres of new young trees have been planted to increase the size of the riparian forest buffer (see "Reforestation areas" on *Map 2*). These plantings also fill in indentations in the existing forest outline, thus reducing the amount of forest edge and increasing the proportion of forest "interior" so important for many wildlife species.



Legend

- Property Boundary
- B1a - Slight Limitations
- B1b - Slight Limitations
- E3a - Slight Limitations
- B1c - Moderate Limitations
- G2 - Severe Limitations
- Drainage
- Topographic contours (ft.)

0 500 1,000 2,000 3,000 4,000 Feet

MAP 3
Site Analysis - Soils
Sassafras NRMA
Resource Planning
Maryland Department of Natural Resources

Map Graphics by DNR - RP - wdt-03/12/02
File: Map 3 SA Soils.mxd

Stand descriptions:
The largest stand type occurs on ravine slopes and nearby upland edges throughout the site, totaling 171.5 acres. Dominant overstory species are red, chestnut, and white oaks, with some red maple, hickory and American beech. Understory species include black gum, sassafras, black locust and scattered pockets of poplar. The stand is uneven aged, with both mature and immature trees. The lowest layers of vegetation tend to include weedy non-native species such as Japanese honeysuckle.

Other upland stands occur in isolated pockets. At the top of the ravine that separates the two sections of steep cliff along the Sassafras is a 28 acre stand of uneven aged but fairly young trees that may indicate where an old field has grown up. Black locust and black cherry dominate, with red maple, ash, tulip poplar and sassafras in the understory. A 38 acre grove of mixed hardwoods 16 - 22 inches in diameter, with tulip poplar dominant, grow on the slope between the two ravines that drain into the tidal pond. This area includes a cutover area of 12 acres of tulip poplar that were storm damaged in 1994. Along the shore of Turner Creek is a 19-acre grove of tulip poplar with mixed hardwoods in the understory.

In the 23 acre wooded swamp between the two sections of cliff grow a variety of bottomland hardwoods, including sycamore, ash, yellow poplar and red maple, with mixed gums and red maple in the understory.

Several brushy areas on the site also contain trees. The yard around the old lodge and outbuildings contains mixed yard species. Near the mouth of Turner Creek are the remnants of an old plant nursery where today Red oak, black cherry, red cedar and dogwood grow in a brushy area overgrown with greenbrier and multi-flora rose. An area of small trees and brush occurs between the old lodge and the terraced farm fields that lead to the tidal pond.

Results of Planting Program:

Survivability of planted forest buffers has generally been fairly good. Some natural forest regeneration is occurring in planted areas, primarily in sweetgum and sycamore.

Noxious weeds and invasive exotic plants are a considerable problem in reforested areas. Primary species of concern include multiflora rose, Canada thistle, and Johnson grass.

Tidal Pond and Marsh

Cattail and other freshwater marsh plants border the tidal pond at the north end of the property. In the pond itself are found such species as water milfoil, water lily and three problem species described below. The plants in the tidal pond and marsh serve as an important food source for many species of wildlife.

American lotus (*Nelumbo lutea*) covers much of the tidal pond at Sassafras NRMA and is found in increasing abundance in several locations along the Sassafras River. Although native populations of American lotus are considered rare in Maryland, the Sassafras River population is

not thought to be native to the area. It is causing navigation problems in some areas along the river, and efforts to control the plant have been initiated. Despite its rarity as a native plant in some parts of Maryland, American lotus is not a threatened species globally, and this particular population needs to be controlled due to its invasive nature and presumed human introduction to the site.

Water chestnut, a non-native aquatic plant that is hard to control, has seeds with four sharp, half-inch spines that pose a major hazard to water contact recreation. This invasive exotic plant has spread to a number of areas in the Sassafras and Bush Rivers, including the Sassafras NRMA tidal pond. In the summer of 1999 Maryland DNR initiated a control program to harvest water chestnut on these two rivers, but the tidal pond was excluded because funding was limited to occurrences on navigable waterways. A plan to harvest water chestnut on the NRMA is needed in the near future and should include departmental environmental review of the control program.

Phragmites, a widespread reed of low wildlife value, occurs near the mouth of the tidal pond. Common in our region and in wetlands throughout much of the world, Phragmites often grows in an invasive manner, taking over habitats of plant species and reducing diversity. Although not technically an exotic species, it is thought that the invasive stands of Phragmites may be a non-native strain genetically different than the native form of the species. In any case, when Phragmites "behaves" invasively, as a pest species, it needs to be controlled as such.

No motorized boats or jet skis are allowed in the tidal pond. The unauthorized use of motorboats may cause a serious disruption to wildlife that depend on the pond for food and shelter.

Beach

Much of the beach on the western side of the NRMA is essentially bare of living vegetation, as the river shore is scoured by erosion. In areas of deposition, which occur primarily on the eastern and northeastern portion of the shoreline, sandy beaches have developed. The beach is particularly wide along the Sassafras River northeast of the mouth of Turner Creek. Along the upland edge of this beach grow woody shrubs and herbaceous plants. Two species growing on the beach are listed as Endangered in Maryland and are discussed in the Sensitive Areas section below.

AGRICULTURE AND SOIL CONSERVATION

At present, approximately 430 acres of the property are managed in agriculture, through an agricultural lease awarded by DNR. Agriculture is maintained on the property in order to control noxious weeds, generate revenue, and maintain open vistas. Crop residue after harvest also meets some wildlife food needs, particularly for waterfowl. Primary crops produced include soybeans, corn, and wheat.

The farmed acreage is limited to the level or gently sloping upland. The tenant for the farmland is required to follow a Soil and Water Conservation Plan prepared by USDA Natural Resource

Conservation Service (Kent County) in 1995. [9] The plan requires conservation methods such as crop rotation, a conservation tillage system, maintenance of buffers and grassed waterways, and retention of cover crop or field stubble over the winter months to avoid excessive erosion. The tenant also participates in a nutrient management program, which identifies recommended nutrient application rates based on test results for each farm field, in order to minimize water pollution. [10]

Since the property was placed under the care of the State Forest and Park Service, 28 formerly tilled acres have been placed in the Conservation Reserve Program (CRP). An additional 62 acres were also planted that were not part of CRP, including 27 acres planted in trees. These areas provide wildlife food as well as erosion control and are maintained as required via mowing and spraying. In all, 90 acres of former farmland have been converted to developing forest and native grass stands.

Several other conservation measures have been undertaken during the interim management period since acquisition of the property. In 1999, ten acres of corn were left unharvested to provide a winter food source for wildlife. A freshwater pond was constructed for sediment control as well as for waterfowl habitat, aquatic life, and wetland development. (These activities are further described in the Wildlife section and Fisheries section, below). In addition, disturbed areas such as an old gravel pit on the NRMA have been stabilized to control sediment and enhance visitor safety.

WILDLIFE

The diverse habitats at Sassafras NRMA support a variety of wildlife species, such as whitetail deer, beaver, muskrat, raccoon, gray squirrel, opossum, red fox, woodchuck and chipmunk. Geese and ducks are plentiful as are many species of songbirds. The relatively large forested areas on the NRMA provide breeding habitat for birds that are considered to be Forest Interior Dwelling species (FIDS), as depicted in ***Map 4: Site Analysis - Ecologically Significant Areas***, as well as for many other less sensitive forest and edge dwelling avian species. The NRMA supports a variety of birds of prey, including osprey, red tailed hawk, harrier, bald eagle, vultures, and presumably a few owl species as well. Additionally, a myriad of migratory songbirds may be found using the woodlands on the NRMA as transients on their twice-yearly migrations. Although an exhaustive inventory of the fauna has not been performed, the NRMA probably also supports most of the common amphibian, reptilian, and invertebrate species found in the region.

A number of rare and protected species and habitats have been identified on the site, including a nesting pair of bald eagles. These protected species are discussed further in the section below entitled “Sensitive Areas.”

In an effort to protect and enhance the water quality of the Chesapeake Bay and its tributaries and to increase forest habitat at Sassafras, over the last five years approximately 90 acres of former cropland has been planted in trees or allowed to regenerate naturally. These recently established areas have provided additional winter cover for upland and forest animals, and temporary

grassland habitat. As these plantings mature over the next few decades, they will begin to provide habitat for various woodland wildlife species. In time, it is hoped that these plantings will develop into old, stratified forest stands which may one day support breeding populations of FIDS, as well as other wildlife species commonly found in mature woodlands.

Waterfowl Resources

The temporary and permanent aquatic habitats available on the NRMA support a number of resident and migratory shore bird, wading bird, and waterfowl species. Of primary importance is the value of the NRMA and its adjacent waters as an historic waterfowl concentration area (see ***Map 4: Site Analysis - Ecologically Significant Areas***).

The Sassafras River shoreline and much of Turner Creek have long been considered extremely important roosting areas for wintering waterfowl species. More than 15,000 waterfowl utilize Turner Creek, and it is particularly important to Canada geese and greater snow geese. The large agricultural fields present on the NRMA, with their close proximity to these roosting areas, have historically been important feeding areas for geese. In 1999 and 2000, the Wildlife and Heritage Service purchased 10 acres of standing corn from the farmer each year, using State Waterfowl Stamp monies, in order to provide a winter food source for migratory waterfowl.

The tidal pond adjacent to the Sassafras River serves as a brood area and feeding and resting area for dabbling ducks, such as wood ducks, mallards, and black ducks (a species of special concern). It is anticipated that over time the newly constructed freshwater pond will also provide habitat in the form of plants and invertebrate foods for dabbling ducks, wading birds, and shorebirds.

FISHERIES

Fisheries resources on and bordering Sassafras NRMA fall into two categories - those fish that inhabit the freshwater pond, and those that inhabit the tidal waters bordering the management area.

The Freshwater Pond

Since acquisition, a small (two hectare) impoundment has been constructed to create a freshwater pond for sediment control, waterfowl habitat, aquatic life, and wetland development. Surface and base flows contribute to the pond, which is located at the headwaters of the first ravine northwest of the NRMA entrance. Consistent rainfall is necessary for maintaining pool height at levels capable of supporting fisheries resources. At full pool height, maximum depth is approximately 6 feet. Water quality parameters are currently acceptable for supporting aquatic life, however an extremely high alkalinity may indicate that the pond is extremely sensitive to farm field applications (a likely source of alkalinity).

In 1998, buffer plantings were established around the newly constructed freshwater pond to stabilize the shoreline and protect water quality. Plants used included both forest tree species and

native warm season grasses. The buffer plantings will provide habitat for various wildlife species and will enhance the aquatic habitat through improved water quality. Fingerling largemouth bass and bluegill were stocked in the summer of 1998, and adult bass were stocked in the summer of 1999. Subsequent sampling indicated that these stockings were successful.

Additional habitat enhancement measures, in the form of bundled Christmas trees, were introduced into the pond in the spring of 1999. These shelters provide cover for small fish as well as ambush sites for larger fish. Future enhancement measures will be implemented to provide suitable nesting medium for bass and bluegill. Further habitat management will be required on a regular basis to control nuisance emergent vegetation, especially Phragmites.

Tidal Fisheries

Abundant fisheries resources inhabit the tidal waters bordering Sassafras NRMA. Among the most common are: striped bass, largemouth bass, channel catfish, white catfish, yellow perch, white perch, American eel, bluegill and pumpkinseed. In an open system such as the Sassafras River these fish species will come and go from these waters in accordance with tides and seasonal migrations.

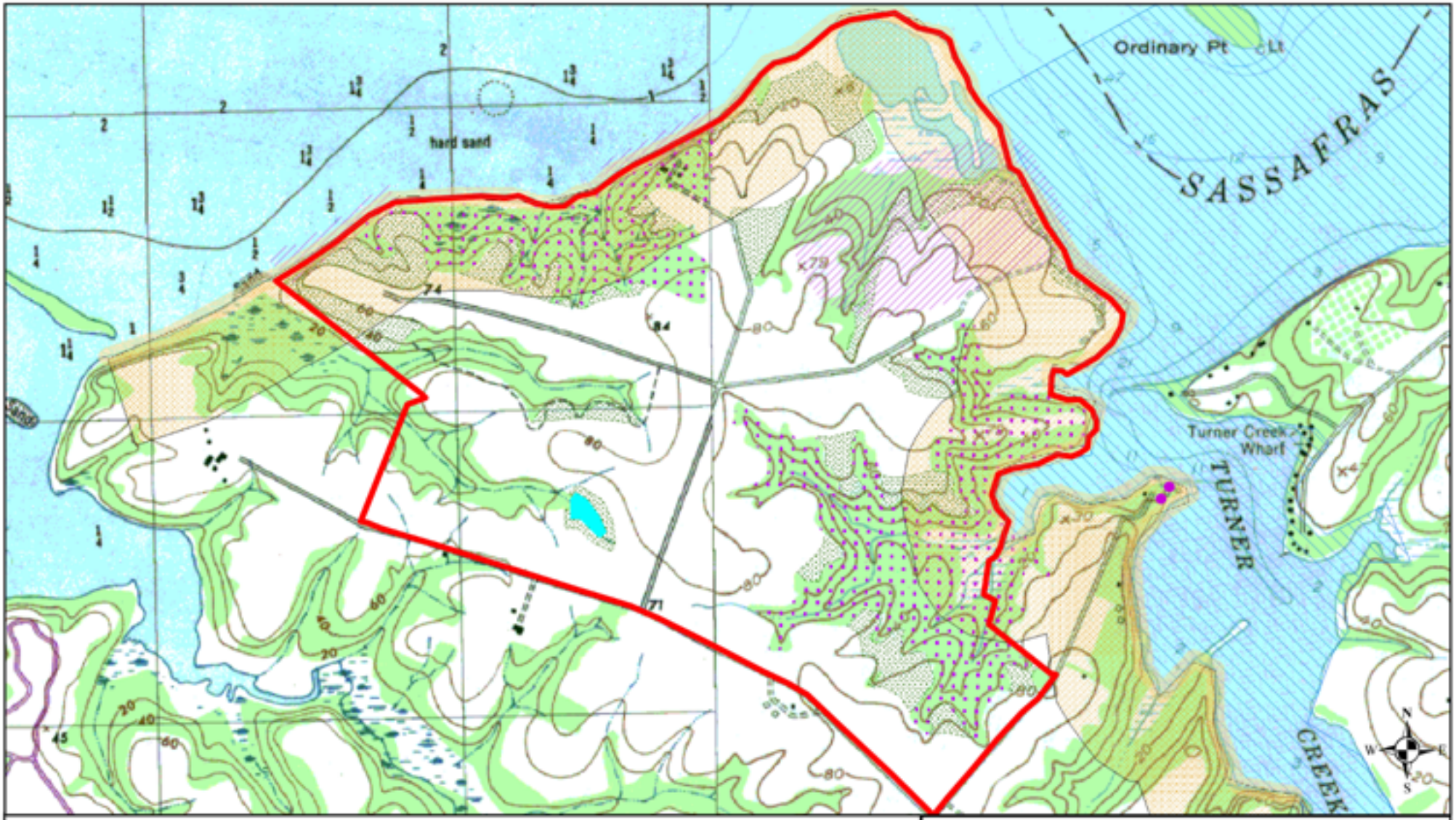
SENSITIVE AREAS

Map 4: Site Analysis - Ecologically Significant Areas depicts sensitive areas at Sassafras NRMA such as the historic waterfowl concentration area, the habitats of rare, threatened and endangered species and of Forest Interior Dwelling Birds (FIDS), and the Chesapeake Bay Critical Area and its 100 ft. buffer.

Rare, Threatened and Endangered Species

Several rare, threatened and endangered species occur on the NRMA. Since 1983, a pair of bald eagles (listed as both State Threatened and Federally Threatened) has nested in a large old tree at the forest edge, overlooking the broad slopes that lead down to the Sassafras River beaches where the eagles teach their young to fish for food. The nest site has been monitored using fixed wing aircraft each nesting season since 1990. It has produced live offspring every year except 1993 when the nest was partially destroyed in a storm. Under present regulations, an active eagle nest site must be protected, and if it becomes inactive the site must have been naturally abandoned for 3 years before protective restrictions are relaxed. (Protection guidelines are detailed under Management Recommendations and in Appendix VII.)

Puritan tiger beetles (*Cicindela puritana*), which are listed as Threatened under the Federal Endangered Species Act and as Endangered on the Maryland list, inhabit the steep eroding cliffs along the Sassafras River on the northwest side of the NRMA. The cliffs act as critical habitat for tiger beetle larvae, while the sandy beaches below are the primary foraging habitat for the adults. Puritan tiger beetles occur in only three areas of the world - the cliffs of Calvert County on Maryland's western shore, two sandy beaches along the Connecticut River in New England, and



Legend

- Property Boundary
- 100' Buffer of Critical area
- 1000' Buffer of Critical Area
- Fresh Water Pond
- Forest Interior Dwelling (FID) Species Habitat
- Waterfowl Concentration Area
- Rare Species Habitats
- Re-forestation

0 500 1,000 2,000 3,000 4,000 Feet

MAP 4

Site Analysis - Ecologically Significant Areas
Sassafras NRMA
Resource Planning
Maryland Department of Natural Resources

Map Graphics by DNR - RP - wdt-03/07/02
File: Map 4 SA EcoSigArea.mxd

the cliffs along Sassafras River, including Sassafras NRMA. [11] Here, larvae of *C. puritana* inhabit the sandy middle to upper strata of the cliffs. Researchers monitor these sites periodically in conjunction with DNR's Wildlife and Heritage Service. Population levels fluctuate from year to year, but counts in 1999 were among the lowest recorded in the eight years these sites have been surveyed, perhaps due to significant storms in the prior two years causing excessive erosion of larval habitat. Researchers are concerned that if the recent decline does not reverse itself, continuance of the Sassafras River puritan tiger beetle population may be imperiled. [12]

Sandbar willow (*Salix exigua*), a herbaceous State Endangered plant, grows along portions of the beach approximately at the mean high tide line. This population is one of only about 6 in the state and it may have better potential than other sites for long term protection, as it is the only population occurring on state-owned land. Higher on the beach grow mature specimens of another State Endangered plant, a woody species known as beach plum (*Prunus maritima*). Its plump fruits are a prized food source for wildlife. These plants were observed during surveys conducted by the Wildlife and Heritage Service to identify threatened and endangered plant populations in the county.

Eroding Cliffs

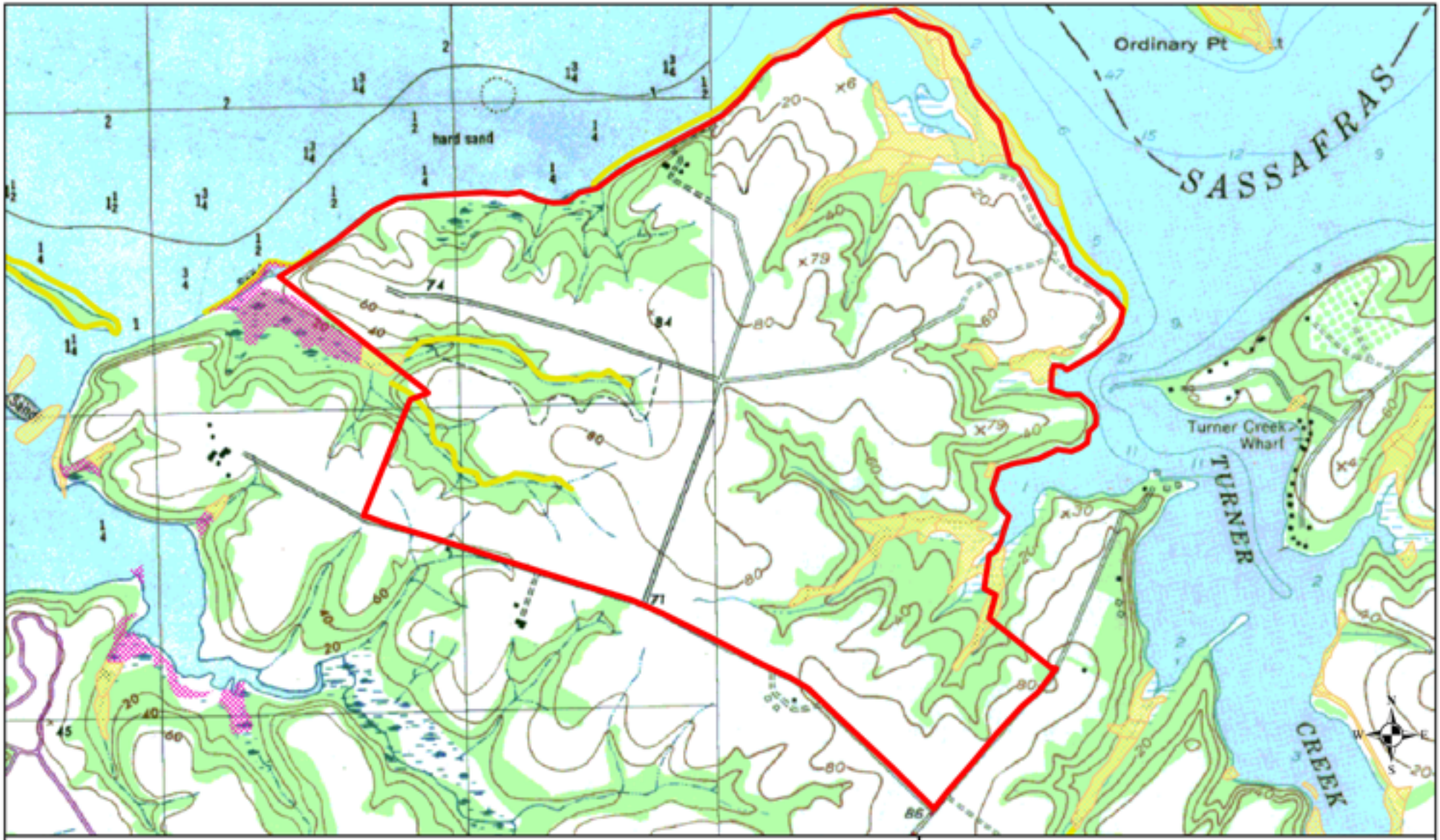
Increasingly rare due to structural shoreline erosion control measures and other side effects of human development, eroding cliffs are a unique and sensitive habitat, often harboring a number of uncommon species. The required habitat of the endangered Puritan tiger beetles at Sassafras is steep, sandy banks, free of vegetation, so some level of natural erosion is required to maintain their habitat.

Chesapeake Bay Critical Area

More than half of the land area of the NRMA is contained within the Chesapeake Bay Critical Area, defined as that land occurring within a thousand feet of mean high tide of the Chesapeake Bay and its Chesapeake Bay tidal tributaries. This land is subject to restrictions to potential development, under the Chesapeake Bay Critical Area law designed to protect water quality and living resources in the bay and its tributaries. In particular, the 100 ft. nearest the shoreline ("the 100 foot buffer") is considered to have the most critical role in protecting the bay and thus is the most strongly protected by regulation from impact or disturbance.

Wetlands and Erodible Soils

Wetlands are valuable for wildlife habitat and for watershed protection, and are often hot spots of biodiversity. At Sassafras the tidal marsh and pond complex, the wooded swamps on the northwest shore, the marshes along Turner Creek, and the developing marsh fringe around the new freshwater pond provide these important wetland functions. The wetlands at Sassafras are depicted in ***Map 5: Site Analysis – Wetlands.***



Legend

- Property Boundary
- Wetlands
- Wetlands (Streams)
- Special State Concern

0 500 1,000 2,000 3,000 4,000 Feet

MAP 5
Site Analysis - Wetlands
Sassafras NRMA
Resource Planning
Maryland Department of Natural Resources

Map Graphics by DNR - RP - wdt-03/07/02
File: Map 5 SA Wetlands all one color.mxd

The fragile soils of the steeper slopes at Sassafras are extremely vulnerable to erosion. Steep slopes 15 % or greater occur primarily in the wooded upper ravines that dissect the property, and on the high bluffs on the northwest-facing shore of the Sassafras River. Moderately steep slopes occur in some farmed areas, and other farm fields closely approach the steep slopes at the upper end of some ravines, where water enters the ravine during storm events. Water control structures have been installed in several locations in recent years to reduce soil erosion, following guidelines from the Natural Resource Conservation Service.

HISTORICAL AND CULTURAL RESOURCES

Historic Lodge

The historic building on the property (commonly referred to as "the historic lodge") has been determined by the Maryland Historical Trust (MHT) to be a good example of the “bungalow” style of Arts and Craft architecture, a relatively uncommon architectural type from the turn of the twentieth century. Walter T. Pippin, a local contractor for Morris Clothier, built it as a home (or private lodge) in 1919. Rustic construction and characteristic architectural details such as a long and wide upper-level balcony are typical of the architectural type. While in severe need of restoration, the historic home has been only slightly modified from its original design. According to MHT, the home or private lodge has historical significance and should be used with as few modifications as possible.

Native American Artifacts

Archeological investigations of the shoreline at the NRMA have revealed substantial Native American use of the area, primarily as a location for resource extraction for tools.

Knock’s Folly

Renovation of the historic property known as Knock’s Folly is being managed as a curatorship under the direction of the Historic and Cultural Resources Program of the State Forest and Park System. It is not available for public access.

EDUCATION AND RECREATION

A variety of recreational pursuits have occurred during the initial period since acquisition of Sassafras NRMA. Hiking, bird watching, dog walking and horseback riding are popular as are managed hunts held during the fall.

At present, Sassafras NRMA is open to the public from 8:00 AM to sunset. Due to the narrow, unimproved roadways, access is currently limited to pedestrians, horseback riders, and bicycles. Parking is available at the entrance gate where visitors must leave their vehicles. Trails meander throughout the area, accessing many scenic spots. For their own safety, visitors are asked to stay away from the old private lodge and other structures as well as from the high cliffs on the northwestern shore of the property, which are unstable. Swimming is not allowed, but walking or picnicking on the beach is permitted. Rules and regulations are posted near the parking area at the entrance gate.

Youth group camping is available on a limited basis as arranged through the Tuckahoe State Park office. Sassafras NRMA is open to hunting on a limited basis through managed hunts. A limited deer hunt during the firearms season is handled by lottery each fall. Deer hunting is also available on a first come first served basis during both bow season and muzzleloader season. Hunting for other species is currently not permitted. Trapping is also prohibited.

A number of group and public special events have been organized at the site. Kent County Recreation and Parks, the Boy Scouts, church groups, and dog clubs have sponsored organized events such as group hikes and primitive camping. Organized hikes and other activities avoid the area of the eagle nest site, especially during the breeding season from December 15 to June 15.

At present, only authorized service vehicles are permitted inside the entrance gate. No off-road vehicles may be used at the site. The unauthorized use of off-road vehicles is a potential threat to wildlife habitats and natural areas throughout the site.

No motorized boats or jet skis are permitted in the tidal pond. Motorized boats and jet skis could potentially cause serious disruption to wildlife that depend on the pond for food and shelter.

EXISTING FACILITIES

At the time of acquisition, structures present at Sassafras NRMA included three homes and a variety of outbuildings including pole sheds, barns and stock pens. Most of these structures, including two of the dwellings, were found to be unstable and dangerous. Appropriate permits were obtained and these structures were removed. Asbestos-containing materials were removed as approved and funded through the Department of the Environment.

The historic home or private lodge (with approximately 4,000 sq. ft. of floor space) located at the former "Pond Farm" was secured for future renovation as an educational and administrative facility. The roof was replaced with new sheathing, felt paper and shingles. All asbestos and related materials were removed and the facility was secured. The exterior wood siding needs painting but is otherwise in generally good condition.

SITE PLAN

SITE GOAL

Sassafras NRMA helps meet local, regional, and statewide recreational and natural resource protection needs. Based on an analysis of existing conditions, natural resources, and recreational needs, the planning team developed the following major goal statement for Sassafras NRMA:

> *The goal for Sassafras NRMA is to implement land management practices that protect, promote, and enhance the site's natural and cultural resources and to integrate compatible facilities and programs for recreation and education into this framework.*

Consistent with this major goal, the following primary uses will occur at Sassafras NRMA:

- Forest areas will be expanded;
- Wildlife habitat will be enhanced;
- Sensitive areas and species will be protected;
- Educational programs will be developed;
- Resource-based recreation will be encouraged; and
- Agricultural activities will be designed to be compatible with wildlife conservation, following best management practices, soil and water conservation and nutrient management plans, and possibly custom farm leases.

A number of steps have already been taken to move toward this goal. For example, riparian forest buffers have been planted, a freshwater pond has been created, sensitive resources in need of protection the have been identified and strategies to protect them have been developed.

Over time, as resources and staffing permit, the site will slowly be transformed to meet this goal. Planting of warm season grasses will provide wildlife habitat and preserve views and open areas. Agriculture will continue as a land management practice in some parts of the site and other practices such as planting forested areas will be expanded to provide wildlife habitat, water quality benefits, and recreational opportunities. Sensitive areas and threatened species habitats will be protected, and noxious weeds and invasive exotic plants such as multiflora rose will be controlled to the extent possible, so that this site can support native species in their appropriate natural communities. Lawn and meadow will be integrated throughout the landscape, increasing wildlife habitat, providing recreational space, and enhancing the bucolic scenery. Educational programs will be developed to highlight the biology, geology and cultural history of the area. Natural resource-based recreation compatible with protection goals will be encouraged and appropriate recreational infrastructure (trails, picnic shelters, etc.) will be phased into the capital budget process for implementation.

LAND UNIT CONCEPT PLAN

The plan for land use at Sassafras NRMA was derived from the analysis of information provided by the interdisciplinary team. This concept plan suggests the landscape enhancements, conservation practices and recreational uses most appropriate for various portions of the site, based on opportunities and constraints presented by the existing conditions and resources. It establishes three distinct zones or areas within Sassafras NRMA, each of which has characteristics that make it primarily amenable to specific categories of management and use. ***Map 6: Land Unit Concept Plan*** identifies these areas and indicates the proposed uses that will occur in each area. As development of the site proceeds, it may be appropriate to establish sub-zones within zones; for example there may be a natural area designated within the multi-use zone or the day-use area.

Funding for a modest first phase of capital improvements has been approved through the state budgetary process (see following section on Proposed Facilities) and additional funds are being sought for phase II. Necessary staffing and operating funds will also be requested through the state budget process (see following section on Operating Budget) and partnerships with other organizations will be actively sought to achieve mutual goals at Sassafras NRMA.

PLEASE NOTE:
Current staffing and resources available for the management of Sassafras allow only minimal programming and activities at Sassafras. The full development of programs, facilities, and activities as envisioned below is dependent upon expanded funding and partnerships with Kent County, area educational facilities, and other interested organizations and individuals.

DAY USE AREA AND EDUCATIONAL CORE

The northern portion of the site along the Sassafras River will be developed into the Day Use area. Just west of the tidal pond visitors may access the shoreline of the Sassafras River and stroll along the beach. At the top of the slope the historic home will be renovated into a nature education facility with offices and a meeting room. A fence will keep visitors a safe distance from the steep bluffs. On a field adjacent to the nature facility, the plan proposes two picnic shelters with attached restrooms, a modest parking lot, and a handicapped accessible trail.

The variety of habitats combined with sloping pastoral scenery creates this area's aesthetic appeal. From the lodge, gently sloping terraces lead eastward down to the tidal marsh. These terraces will be planted with native grasses to provide wildlife habitat and preserve scenic views. An observation tower may be built to provide a birds-eye view of the tidal marsh and the Sassafras River. The location of the tower will be determined during the detailed site-planning phase of the plan. Improved trails will provide opportunities for hiking, nature observation, hunting and fishing access. A trail will guide visitors east along the woodland border to a level access point along the shoreline.

Site plans will be developed by the architect/engineer as part of the design in each capital development phase, with review and input from the interdisciplinary planning team. The design and location of facilities and operational schedules will be carefully planned to protect natural resources, historical artifacts and properties, and visitor safety.

NATURAL AREA

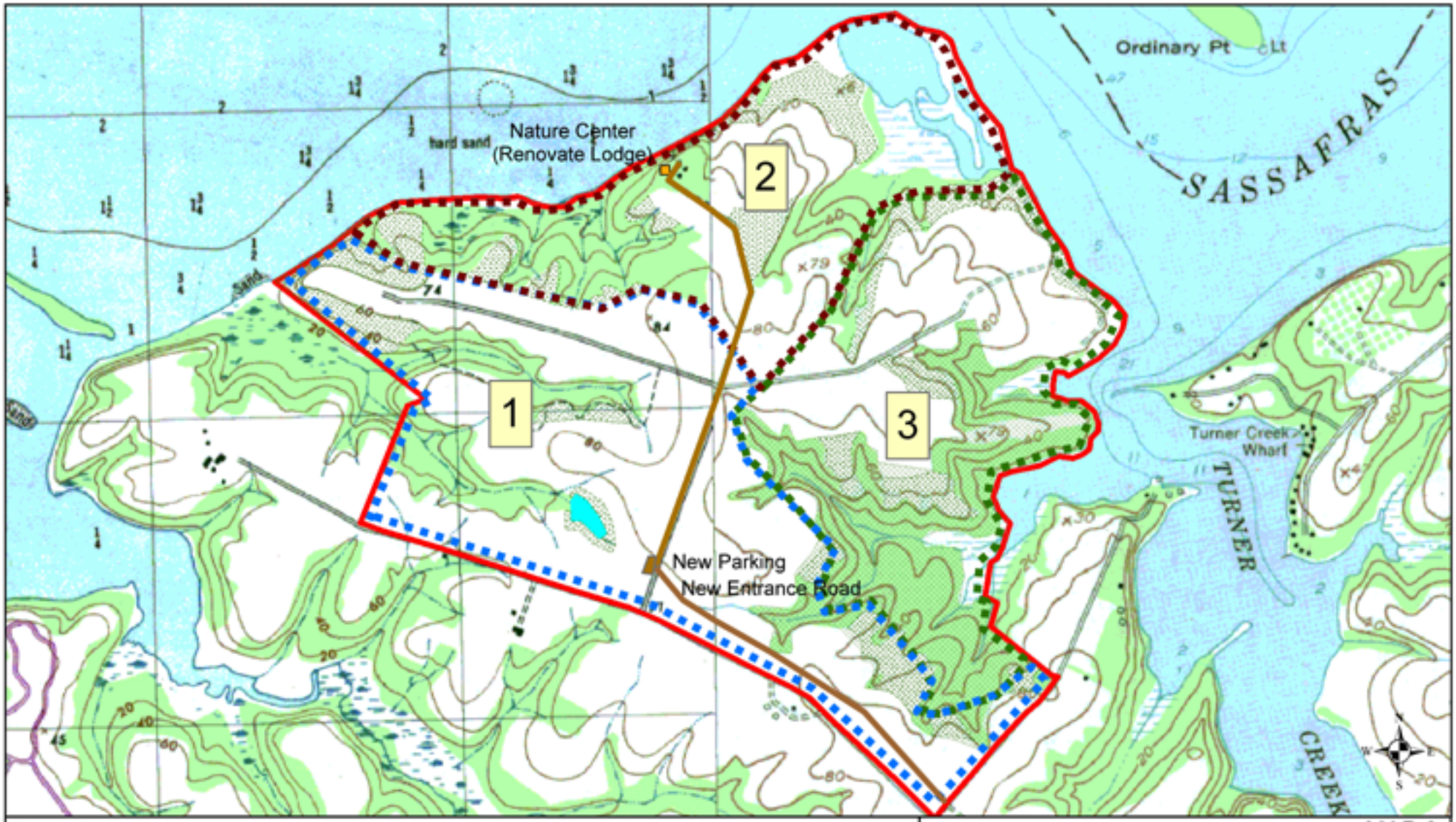
The eastern portion of the NRMA, from the southern edge of the tidal pond to the southernmost ravine will be conserved as a natural area. This area contains a concentration of sensitive elements and will be managed to minimize negative impacts to the plants and animals most in need of protection. Visitors will be allowed to use the area, with some restrictions as required for the viability of sensitive elements. The natural area contains beautiful scenery that visitors will be able to enjoy in its natural state, without buildings or other intrusions.

In the long term, an expansion of the forest in the natural area is envisioned to create a contiguous forest of 100 or more acres in order to increase the amount of native forest and the amount of habitat for forest interior dwelling species. To the degree possible, this will be accomplished through carefully monitored forest restoration, to recreate natural forest communities of locally native species.

MULTI-USE AREA

The southwestern side of the NRMA is designated as a Multi-use Area. The northern portion of the multi-use area is a flat plateau that offers majestic views across the land and water beyond and ends abruptly at the top of a tall cliff on the Sassafras River. Steep forested ravines border the plateau. Recently planted forested buffers will expand the forest over time; warm season grasslands and native wildflower meadows will provide upland wildlife habitat and soften the transition from field to forest. Hiking, hunting, fishing, agriculture, and wildlife management and appreciation will be the primary activities in this part of the multi-use area.

The multi-use area is bisected by the entrance road to the NRMA. A new gate and gravel parking area will be built at the site entrance. A paved walking trail to the new freshwater pond will be created west of the entrance road to provide access for people with disabilities. Farther south, the current farm fields will eventually be managed as a complex of agriculture and mowed fields, with buffer areas planted in warm season grasses and native wildflowers. The mowed areas may be used with a permit, for occasional group activities that require good access and open space but no permanent support facilities.



MAP 6
Land Unit Concept Plan
Sassafras NRMA
Resource Planning
Maryland Department of Natural Resources

Map Graphics by DNR - RP - wdt-03/07/02
File: Map 6 Future Use Concept Plan.mxd

PROPOSED FACILITIES

The limited facility development at Sassafras will occur in phases. At present, only Phase I capital improvements have been approved for funding. Phase II improvements will be submitted once the plan is approved, but there is no guarantee when the Phase II facilities will be built.

Phase I – Gate and 15-car gravel parking lot at site entrance, gravel road restoration and improvement. (APPROVED)

The first phase of capital improvements for Sassafras NRMA has been approved under the State's Capital Budget program and consists of construction and restoration of approximately 6,600 linear feet of 20' wide gravel roadbed, including excavation, grading and compaction of gravel roadbed; construction of a 15 car gravel parking lot, and installation of a control gate at the site entrance to prevent unauthorized access. An architect/engineer has been hired and the DNR interdisciplinary team will review the site plan.

Phase II – Renovation of lodge into a nature center, day use improvements. (PROPOSED)

Proposed Phase II improvements consist of the renovation of the historic home to serve as a public nature center, day use improvements, electrical service, and construction of a gravel access road, new wells, septic drainfield and tank. Planned day use facilities include two picnic shelters with attached restrooms, a 50-car gravel parking lot, two handicapped access paths, and possibly a small pier at the freshwater pond. As part of the proposed Phase II improvements, the renovated historic lodge will include spaces for displays, a classroom, a meeting room, offices and restrooms; and possibly living quarters for an on-site staff member.

The existing floor plan of the lodge is provided in **Appendix III.** The project details for the proposed renovation of the lodge into a nature center are provided in **Appendix IV.** This project information is excerpted from Facility and Design Programs developed by the DNR Engineering and Construction Program. [13] [14] Detailed site plans, when developed by the architect/engineer, will be reviewed by the interdisciplinary team.

Other Facilities

Additional recreational, educational, and safety improvements are recommended in the plan, such as a system of hiking trails, a possible wildlife observation tower, signs and a safety fence along the steep bluffs. Siting and construction schedules for all facilities at Sassafras NRMA will be planned to avoid impacts to sensitive areas and wildlife, as discussed in the Management Recommendations section.

PROPOSED OPERATING BUDGET AND ESTIMATED REVENUE

The proposed operating budget for Sassafras NRMA is detailed in **Appendix V**. It is divided into two sections. The first section provides the proposed budget for the first year of full operation, which totals $ 119,721.00 and includes several one-time expenses such as vehicles. The second section details the proposed budget for annual operating expenses thereafter (the "out years"), which totals $ 68,721.00.

The current budget for operation of the Sassafras NRMA facility falls short of budgetary requirements to operate and manage this site as proposed. Therefore the planning team emphasizes that adequate funding, as detailed in the proposed budget, is essential before full implementation of the recommendations in this land unit plan can occur.

Appendix V also includes an estimation of the annual revenue that may be generated at the Sassafras site. Included are approximations of the actual annual revenue from the two most recent years, and a projection of revenues that may be generated in the first five years following the completion of Phase II site improvements, and in years 6-15 following completion, respectively. Revenue is anticipated from sources such as agricultural leases, hunting programs, and participation in the Conservation Reserve and Conservation Reserve Enhancement Programs (CRP and CREP). After site improvements are complete and management objectives are implemented, possible user fees such as picnic shelter reservation fees may be implemented to provide some additional revenue.

However, if the recommendations in this plan are fully implemented for ecosystem-based management and public use of Sassafras NRMA, a substantial amount of land will be removed from income-generating agricultural use. This land will instead provide ecological benefits, wildlife habitat, expanded forest cover, and public use. Thus the new income anticipated to be generated from possible user fees may be partially and appropriately offset by reduced agricultural lease income. Full operation of this site for conservation of natural resources and for public use will require additional budgeted operating funds.

The planning team therefore recommends that the Department seek through a new facilities budget request additional operating funds to fully operate this important public site.

INTERIM USE

During the period before completion of the site's improvements and until substantial additional operating funds for the site have been secured, facilities for public use will remain limited. During this period, agriculture will remain the dominant land management practice at Sassafras. In addition to generating income and ensuring productive use of the land, agricultural cultivation of the open fields during the interim period is essential to ensure that noxious weeds and invasive exotic plants do not take over the formerly farmed areas.

Resource-based recreation such as hiking, hunting, nature appreciation, and horseback riding can be enjoyed throughout most of the site during this period, with caution exercised in the vicinity of the dangerous steep bluffs. Fishing can be enjoyed at the freshwater pond and shoreline areas.

Resource Management activities during this period will include monitoring and maintenance of the freshwater pond, monitoring of the progress of newly planted riparian buffer forests, control of noxious weeds, monitoring of rare species and monitoring of site use by waterfowl and other species of concern. Annual Work Plans will continue to reflect these and other management activities that further the goals for the NRMA but are not dependent on the completion of recreational facilities.

The construction of modest Phase I improvements - entry road, a new entry gate and small improved gravel parking area - is expected during this interim period.

GOALS AND RECOMMENDATIONS

Implementation

The recommendations outlined in this section will be implemented in phases as staffing and funds permit. Many of these recommendations cannot be achieved with current staffing levels and funding.

Resource Planning staff will work with the State Forest and Park Service land manager and other resource specialists to identify which recommendations can be implemented each year. Decisions will be based on resource concerns and on the availability of appropriate staff and operating budget or special funds to implement projects. The selected recommendations will be incorporated as objectives into the land manager's Annual Work Plans and appropriate DNR staff members from various units will need to provide assistance to the land manager to achieve those objectives.

Partnerships with Kent County, educational institutions and other interested parties will also be sought to pursue joint initiatives related to these recommendations.

RESOURCE MANAGEMENT RECOMMENDATIONS

The goals outlined below reflect broad strategies designed to achieve good stewardship of the vast resources of Sassafras NRMA over the long term: protection of sensitive features, sound resource management practices, and the restoration and enhancement of habitats.

The recommendations are organized by the major categories of focus for resource management activities, such as Wildlife, Fisheries, Historical and Cultural Resources, and the Maintenance of Natural Processes. For each category, the general resource management goal is identified and one or more management recommendations are suggested to achieve this goal. In some cases, recommendations may be repeated or similar for more than one category, because a management practice often affects multiple resources.

Implementation of some recommendations, such as those concerned with protection of resources by avoiding disruption, is underway and will continue. However, many recommendations will be implemented in phases as staffing and funding permit.

MAINTENANCE OF NATURAL PROCESSES

Goal: To the extent feasible, protect and restore the natural geological, hydrological and ecological processes at Sassafras NRMA.

Management Recommendations:

- Allow natural shoreline erosion processes on the unstable bluffs to continue, as the resulting bare cliff faces create a unique ecosystem and support its dependent species. Prohibit climbing on cliffs from above or below. Monitor bank erosion and prevent visitors from walking on dangerous and sensitive overhanging cliff tops through the construction of fences and warning signs in the vicinity of the high banks. (Refer to "Other Management Strategies" section for more details regarding recommendations for fencing and signs near the bluffs).

- Allow natural tidal processes and deposition and erosion forces to occur at the tidal pond and marsh. It is recognized that this system is partially supported by a manmade berm and that the supporting structures are gradually deteriorating and could give way during a storm, changing the character of the existing tidal pond and marsh. Although the pond provides excellent wildlife habitat, the shoreline features that would likely develop following storm blowout of the tidal pond retaining wall would also provide wildlife and ecological benefits.

- As much as possible, allow natural ecological processes to proceed within existing forests and within newly forested areas once established. Retain snags, standing dead trees, and

coarse woody debris on the forest floor. Allow natural development of a stratified understory layer. (Also see Forestry section.)

FORESTRY

Goal: Conserve the existing forest at Sassafras NRMA to provide habitat for native plant and animal species, to enhance ecological functioning, and to promote recreational activities in a natural forested setting; consider forest expansion where appropriate.

Management Recommendations:

- Work closely with the Forestry Division to conserve riparian forest buffers, both existing mature riverside forests and recently planted buffers. Monitor recently planted areas and replant where necessary. Consider the feasibility of establishing permanent buffer monitoring wells to monitor water quality improvement following forest establishment, including the availability of resources and expertise to track the results.
- Over the long term, work with the Forest Service to expand total forest cover within the NRMA by 25 % to approximately 525 acres of forest land. Evaluate potential opportunities to create large blocks of contiguous forest and forested connections between blocks, such as a possible forested corridor connecting forests on the east and west sides of the site. Reduce forest edge effects by planting trees or allowing natural regeneration to fill indentations in the existing forest edge (but maintain an aesthetically pleasing forest outline, not a straight line).

  Forest expansion will increase habitat for forest interior dwelling species and neotropical migrant bird species and will provide wooded corridors for wildlife travel. Larger forest blocks with reduced amount of forest edge will protect habitat for forest interior species such as ovenbirds, barred owl and many warblers. Conditions will be less favorable in these areas for species that prefer forest edges, such as deer, raccoons, and brown-headed cowbirds. Edge species are more common than forest interior species in the altered landscapes that are common today, and they adversely impact the scarcer populations of deep forest dwellers through predation, nest parasitism, etc.

- Plant only native trees characteristic of the local site and topographic zone whenever possible, using seed sources from as close as possible, or allow natural regeneration. (See Vegetation section under Existing Conditions for examples of tree species native to various vegetative communities at Sassafras.)

- Within the Natural Area, work with the Forest Service and with Wildlife & Heritage Service ecologists to emphasize natural forest regeneration or techniques developed specifically for regeneration of native forest cover. Restrict forest disturbance in the Natural Area to that required for safety, low-impact recreation (e.g. unpaved trail development) and control of exotic species and noxious weeds.

- Allow natural ecological processes to proceed within existing forests and within newly forested areas once established. Allow forests to mature. Retain snags, standing dead trees, and coarse woody debris on the forest floor. Allow natural development of a stratified understory layer.

- In cooperation with the Forestry Division, develop a fire management plan. Within the Natural Area, the fire plan should allow controlled understory burns if needed to control fuel buildups (but continue to protect public safety and capital investments).

- With assistance from the Maryland Forest Service and the Wildlife and Heritage Service, develop educational programs on topics such as stages of succession, tree identification, native species characteristics, control of exotics, forest soil development, and benefits of snags and coarse woody debris, etc. Show natural regeneration in recent storm damage salvage harvest area.

- Evaluate the potential and desirability for planting hedgerows along lanes.

- Consider designation of all or a portion of the area indicated on the Concept Plan as "Forest Conservation Area" for the purpose of serving as a conservation bank to mitigate for any trees removed for facility development at Sassafras NRMA or perhaps other public land units. This area is to remain permanently in forest cover.

- Photograph the site, including young forest areas, to show how the NRMA changes through the years.

AGRICULTURE / SOIL AND WATER CONSERVATION

Goal: Manage agriculture at Sassafras NRMA to minimize soil erosion and the runoff of nutrients, pesticides and other chemicals from the land, to benefit wildlife, and to provide revenues if needed for the operation of Sassafras NRMA.

- Continue to follow recommendations of the Soil and Water Conservation Plan, and ensure that it is updated periodically as needed.

- With assistance from the Wildlife and Heritage Service, seek ways to modify farming practices to benefit wildlife, perhaps through custom leases with provisions such as leaving unharvested rows of corn in appropriate areas to provide a winter food source for migratory waterfowl.

- In cooperation with appropriate units of DNR, evaluate existing nutrient management plan to ensure that is provides optimal monitoring of soil nutrients and agricultural runoff and to minimize nutrient enrichment of surrounding waters.

- Develop an integrated pest management program.

- Consider the possibility of implementing organic farming practices or colonial farm techniques on part of the farm acreage, perhaps for demonstration areas in conjunction with the Farm Museum (pending availability of appropriate funding.)

- Evaluate the current role of agricultural lands at the site, and consider the costs and benefits of alternatives such as warm season grass fields, more extensive forests, or alternative crops that might better fulfill natural resource objectives.

OTHER VEGETATION MANAGEMENT

Goal: Manage vegetation on the NRMA in a manner that conserves native vegetation, promotes wildlife habitat, reduces the impact of invasive non-native species, enhances visitor experiences, reflects the vegetation history of the site, and promotes the ecological health of the area.

Management Recommendations:

- Control noxious weeds and invasive exotic species (such as multiflora rose, Canada thistle, and Johnson grass) throughout the site, including agricultural fields, forest/field interface, and especially in regenerating and newly forested areas.

- Develop an effective control program for the three invasive species found at the tidal pond site: Water chestnut, American Lotus, and Phragmites. Monitor the extent of each species before and after treatment and the long-term effect of control efforts.

- Protect rare species as described in the section on Sensitive Species below.

- Evaluate the benefits of various "soft edges" between forest and field, and develop and implement a planting and maintenance plan for these transitional habitats. Evaluate pros and cons of grass filter strips and other kinds of soft edges. Evaluate the potential use and benefits of warm season grass plantings.

- In the Conservation Area, develop a planting plan using native species, emphasizing plants that offer wildlife benefits.

- In high visibility locations such as portions of the Day Use Area and the NRMA entrance, develop planting plans that enhance the beauty of the site, emphasizing native plants and wildlife benefits.

WILDLIFE

In addition to direct input from Division of Wildlife and Heritage professionals on the Sassafras NRMA planning team, elements of this section were adapted from the *Wildlife Management Plan* developed for Sassafras NRMA in 1995. [15]

Goal: Conserve and enhance the habitat essential to maintain viable populations of native wildlife species that inhabit the area and ensure their perpetuation as viable components of their ecosystems.

Nongame Species

Goal: Follow sound land management practices that enhance the habitats of nongame wildlife species.

Management Recommendations:

- Maintain and enhance habitat for forest interior breeding birds and other forest interior dwelling (FID) species to create large blocks of forest with minimal edge and forested corridors connecting them.

  Current FID habitat at Sassafras NRMA, as identified by the Wildlife and Heritage Service, is mapped in ***Map 4: Ecologically Significant Areas.*** Forest interior breeding birds depend on large, contiguous tracts of forest during the breeding season. Due to intense fragmentation and loss of forestland in the Coastal Plain, this type of habitat has been featured for special protection in the Chesapeake Bay Critical Area.[16] Riparian woodlands provide ideal habitat for forest interior breeding birds due to their size and structural characteristics.

  In order to preserve these important habitats, they should not be harvested. Additional acreage of forest contiguous with existing riparian forests should be planted or allowed to regenerate, as described previously in the Forestry section. Additional guidelines for the management of FID habitat are provided in Appendix VI.

- Establish grassland habitat.
  Grassland wildlife species habitat has been identified in the Wildlife Management Institute Report on Regional Wildlife Habitat Needs Assessment (1995), as a habitat in need of restoration. Large blocks (10-50 acres) of warm-season grasses and forbs should dominate the vegetation on these sites. Riparian protection and buffer zones should also include areas composed of vegetation suitable as habitat for grassland-nesting wildlife.

  Management of these warm-season grass habitats should be carefully designed to protect grassland-nesting species. Warm season grassland areas may be maintained through prescribed burning or by mowing outside of the nesting season.

- Establish nest boxes.
  Many species could benefit from the placement of nesting structures on the site, such as bats, barn owls, bluebirds, kestrels, osprey, and wood ducks, as suitable nest sites are often identified as a limiting factor in these populations. These structures, as well as recommendations for placement, can be provided by the Wildlife and Heritage Service.

  A bluebird nest box trail should be established along the existing entry road, utilizing the telephone poles adjacent to the road. These nest boxes should be cleaned and maintained each year in early spring.

Waterfowl Species

Goal: Conserve and enhance the suitability of this site for wintering migratory waterfowl and implement sound land management practices that enhance all aspects of habitat requirements for geese and other waterfowl species.

Management Recommendations:

- Maintain some of the open fields in agriculture, in the typical corn, wheat, and soybean rotation. Consider leaving unharvested strips of corn 12-15 rows wide near the center portions of the fields to provide late winter forage for Canada geese. Negotiate amended farm leases accordingly, to account for these and any other changes that are recommended for the purpose of enhancing wildlife use of the area.

- To provide additional green forage for geese, consider converting portions of some farm fields to permanent pasture of Ladino/Alsike clover or preferably a native species that would serve the same function. No unharvested soybeans should be left as winter foods for geese, since they may cause impaction and kill geese.

- Establish wood duck nest boxes in scattered woodland locations near wetlands to provide cover for their brood. Each box should be visually isolated from other boxes and should be relatively inconspicuous. Boxes should be mounted on posts with conical predator guards and should be cleaned out and maintained no later than March of each year.

- Initiate a program to control all stands of the invasive *Phragmites* reed in order to conserve plant species more desirable for wildlife.

- In order to preserve the continuing value of Turner Creek as a historic waterfowl staging and concentration area, and the value of the agricultural fields to foraging geese, consider ways to redirect visitor activities that may routinely disturb these birds. From September 20 to March 31, encourage visitors to avoid agricultural fields where wintering geese may be foraging, if possible. The temporary restriction of recreational activities on certain fields may be considered if needed to maintain the value of the NRMA to foraging geese.

- The Wildlife and Heritage Service should be contacted for technical assistance if any activities are planned in the future that might disturb the shoreline along Turner Creek or the eastern portion of the Sassafras River shoreline on the NRMA. Under Chesapeake Bay Critical Area law, certain new water-dependent facilities may not be constructed in these areas.

Upland Wildlife Species

Goal: Initiate sound land management practices which enhance upland habitat.

The recommendations of this section present several key upland wildlife management practices used to enhance field borders along permanent cover. The edges of agricultural fields are sometimes of lesser value for the production of crops due to shading and root competition from the adjacent woody growth. Therefore field border management involves dedicating some of the least productive areas in a field to help provide the year-round habitat requirements of many upland wildlife species.

Management Recommendations:

- Nesting Cover
  Establish native warm season grasses as nesting and brood cover for Bobwhite quail and other upland birds. Quail usually nest in grasses within 50 feet of a wooded edge. With assistance from the Wildlife and Heritage Service, manage all or part of some field edges as fallow strips by disking every two to three years in rotation to maintain these sections in annual plants. Warm season grasses may be maintained through mowing, disking, and/or controlled burning, in a three-year rotational fashion. Herbicide control of unwanted woody plant succession may be warranted in addition to the other maintenance practices.

- Winter Food and Cover
  Food is rarely a limiting factor for upland game, with the exception of during severe weather. Consider establishing winter food plots near good sources of winter cover offering protection from the elements, such brambles and brush. Species that persist into late February or early March should be planted.

- Hedgerows
  Enhance existing hedgerows, and/or create new hedgerows where appropriate, which consist of multiple rows of native trees and shrubs, accompanied by adjacent grassy strips of nesting cover. Hedgerows established in this combination can provide for the habitat needs of many wildlife species, as well as act as corridors for wildlife movement.

Deer

Goal: Maintain a deer population at a level that is in balance with its habitat and offers recreational hunting opportunities.

Management Recommendations:

- Maintain the public deer-hunting program at Sassafras, both to control the deer population and to provide a quality recreational opportunity (see Education and Recreation section). The deer-hunting program reduces deer browse impact on both crops and forest.

- Periodically monitor crop damage levels and potential deer damage to the forest ecosystem to determine impacts from deer browse, and modify the deer hunting program appropriately if adverse impacts occur.

FISHERIES

Freshwater Pond

Goal: Develop a stable freshwater fishery at Sassafras that offers recreational fishing and contributes to related resource goals such as water quality and wetland enhancement.

Management Recommendations

- In cooperation with the Fisheries Service, manage the freshwater pond as a bass/bluegill fishery unless this fishery fails as a result of inconsistent rainfall and resulting low pool height. Population balance should be monitored annually, especially to monitor the gizzard shad population. If the gizzard shad become overabundant, draining or temporary poisoning of the pond, and starting over with the reintroduction of fish, may need to be considered.

- The forested and warm season grass buffer plantings around the freshwater pond should be monitored and maintained as part of the pond management strategy. Analyze the pond system to minimize any runoff of nutrients or other pollutants into the pond where they could stress the aquatic system.

- Addition of some gravel beds in the pond to be utilized as spawning substrate should be considered since the present bottom substrate is too silty to allow for successful reproduction.

- Aquatic vegetation introduced into the pond by waterfowl should not be allowed to cover in excess of 1/3 of the surface area of the pond. If coverage exceeds this amount it should be controlled via aquatic herbicide or mechanical harvesting. If an aquatic herbicide is used, all applicable regulations and appropriate environmental precautions should be

followed, such as application in early spring when water temperatures are low, so that low levels of dissolved oxygen will not be a problem.

- Fishing should be limited to catch and release with artificial lures only, until assessments indicate the populations can withstand harvest mortality.

- Alkalinity of the freshwater pond should be monitored on a regular basis. Due to the high alkalinity of the pond, field applications of lime and other soil additives should be closely monitored and controlled within the pond watershed.

Tidal Fisheries

Goal: Manage Sassafras NRMA and its visitors in a manner that contributes to water quality and the health of tidal fisheries in the waters surrounding Sassafras NRMA and in the Chesapeake Bay system.

Management Recommendations

- In an open system such as the Sassafras River, management of tidal fisheries resources must be handled on a statewide basis. Monitor recreational fishing at Sassafras to ensure that users adhere to statewide fisheries laws and regulations.

- Protect water quality by adhering to the approved soil and water conservation plan, nutrient management plan, and agricultural best management practices in order to control sedimentation and nutrient run-off.

RARE, THREATENED AND ENDANGERED SPECIES

Goal: Conserve and protect rare species and their habitats, including Federal and State listed species, species tracked by the DNR Wildlife and Heritage Service, and other species of state concern. (For expedience, all of the above may be referred to simply as "rare" species in subsequent text).

Management Recommendations:

- Monitor existing populations of known rare species.

- Follow guidelines to protect known rare species, as described below.

- Survey for additional rare species as time and resources allow, and develop monitoring and protection plans for any additional rare species discovered on the NRMA.

Bald Eagles

Goal: Protect nesting bald eagles at Sassafras, including their nest site, feeding habitat, and appropriate buffers; manage the area for long term suitability for bald eagle habitation.

Management Recommendations:

- Establish major public use facilities and programs in areas other than the vicinity of the eagle nest and the large open area between the nest and the shoreline, which is heavily utilized by the eagles.

- Do not actively promote public use of the shoreline area east of the eagle's nest, especially in spring and summer when juvenile eagles use this area to learn to feed. While public use of this area need not be prohibited unless human visitation is heavy during eagle nesting season, other beach areas should be emphasized for public use.

- A bald eagle Habitat Protection Area has been established and is incorporated into the rare species habitats designation in ***Map 4: Ecologically Significant Areas***. The protection area consists of the land within 1/4-mile radius around the nest tree, which needs to be protected to prevent nest abandonment, plus adjacent habitat used by the eagles for foraging and feeding. Within the protection area, three zones of protection are established.

  Zone 1 extends from the nest tree to a radius of 330 feet and Zone 2 extends from 330 feet to 750 feet in radius. Zone 3 extends from 750 feet in radius to the edge of the protection area, which is a minimum of 1/4 mile (1320 ft.) in radius each direction, and farther to the east to accommodate prime feeding areas. Guidelines that should be implemented to protect the nest site are summarized below. These guidelines are adapted from the National Wildlife Federation (NWF) guidelines. [17] (The outer boundary of Zone 2 is expanded to 750 ft. from the 660 ft. minimum standard NWF guidelines, due to the open nature of the terrain.)

  1. No land alterations should occur in Zone 1 or 2 at any time. Examples of prohibited activities include land clearing, timber harvesting, or construction of trails, roads, or buildings, including all construction activities such as clearing, grading, or building.
  2. People should not be allowed in Zones 1 and 2 during the eagle-nesting season, from December 15 through June 15. This restriction includes all public use, and especially use involving large groups or prolonged stays. Most land management activities are also prohibited during this time. However, in Zone 2, some routine farming activities may be possible during this time if researchers have found the nesting eagles on this property to be tolerant of these activities in the past.

3. Throughout the protection area, including Zone 3, no land use changes should occur from December 15 to June 15, including timber cutting, land clearing and construction activity for roads, trails, or buildings. Other activities may need to be restricted in Zone 3 if they are within sight of the eagles on the nest or interfere with foraging or other normal behaviors of the eagles.

Further details regarding protection recommendations in each zone are provided in Appendix VII.

- The designated trail network developed for Sassafras NRMA should avoid the eagle Habitat Protection area, or trails within the Habitat Protection Area should be closed from December 15 through June 15, with trail construction and maintenance also performed outside of the window of time.

- In concert with the Wildlife & Heritage Service and other partners, consider posting signs at the perimeter of area in which visitation is prohibited during the breeding season (see #2 above). Develop wording such as "Area beyond this sign closed to visitors December 15 to June 15. Entering area beyond this sign may cause Bald Eagles, a threatened species, to abandon their nest." Also in partnership with Wildlife & Heritage, consider development of a viewing platform at an appropriate distance from the eagle nest in a location where it can be seen through binoculars, and erect an interpretive sign at this location giving information about bald eagles.

Puritan Tiger Beetles

Goal: Protect endangered puritan tiger beetles and the unique ecology and geology of the eroding banks in which they dwell.

Management Recommendations:

- Avoid construction of shore erosion control devices or other activities that would significantly reduce bank erosion or would result in vegetation establishment on the bare cliffs in areas inhabited or potentially inhabited by endangered *C. puritana* tiger beetles.

- Erect fences and signs to protect eroding banks from human use and visitors from the dangerous high cliffs. Place fences and signs at least 50 to100 feet behind tops of cliffs to prevent loss of fences due to erosion.

- Prohibit climbing on cliffs from above or below.

- Where the forest behind the tops of the eroding banks is less than 100 feet wide, allow natural vegetation to regenerate in the 100 feet nearest the cliff top.

- Avoid building any new structures near the high eroding bluffs. If any new structures other than safety fences are planned directly behind the high bluffs, they should be sited at least 300 feet from the top of the bank.

- Maintain contact with researchers who monitor the endangered tiger beetle population. Species experts report that moderate beach use by humans is probably not a problem for the beetles. [18] If necessary, monitor future levels and impacts of human use of the beaches that serve as feeding habitat for adult *C. puritana*, and consider management strategies if potential impacts become a concern.

Rare, Threatened and Endangered Plants

Goal: Protect rare plant populations and their habitats at Sassafras NRMA.

Management Recommendations:

- Protect the sandbar willow population and its habitat.
  Limit trampling of sandbar willow by encouraging public use of upland areas and alternative shoreline areas rather than the area where this species occurs. With assistance from the Wildlife and Heritage Service, establish an ongoing monitoring program to assess Sandbar willow population size, vigor, and visitor impacts. The establishment of a permanent photo point is suggested, with photos to be taken from this point at regular intervals and compared to detect any population decline. If trampling occurs to a problematic degree, consider limiting public use of affected portions of the beach at high tide. Only as a last resort, consider fencing to close the stretch of the beach where the major portion of the plant population occurs.

- Protect the beach plum population and its habitat.
  Monitor the size and health of the beach plum population and any visitor impacts. Prohibit fires on the beach and the collecting of firewood from the beach.

OTHER SENSITIVE NATURAL RESOURCES

Goal: Protect sensitive resources such as erodible soils, steep slopes, streams, wetlands, and shorelines from human sources of disturbance, and restore areas previously disturbed where feasible.

Management Recommendations:

- No construction should occur on erodible soils, or on or near steep slopes, streams or wetlands. With the exception of fencing and warning signs to protect visitors, no new structures should be built within 300 feet from the edge of the high bluffs.

- The width of the riparian forest buffer should be expanded to a minimum of 300 feet along streams.
- Soil conservation measures designed to prevent further erosion of the steep ravine slopes, such as grassed waterways, should be maintained following appropriate soil and water conservation guidelines.

- Evaluate the need and potential sources of expertise and funding for stream bank restoration projects in eroded woodland ravines.

- Trail design should carefully follow the contour of gentle slopes, avoiding steep slopes, especially where erodible soils occur. In general, trails should also avoid wetland areas. If access through a portion of a wetland is needed such as for educational purposes or to provide access to safe shoreline areas, boardwalk construction should be considered, following careful procedures to protect the wetland. As with all projects that entail landscape alteration, trail development plans should undergo DNR project review before construction.

- Follow Chesapeake Bay Critical Area Commission guidelines for all activities in the Critical Area and particularly in the 100-foot buffer, including the avoidance of shoreline erosion control devices that would inhibit the natural processes of erosion of the steep cliffs. No new facilities should be built within the 100-foot Critical Area buffer.

- Consider stabilization of certain shoreline sites such as the tidal marsh between the two cliff areas or the forested bluff above Turner Creek if, after careful monitoring, it is determined that a) the site is threatened and in need of stabilization and b) such stabilization will not to adversely impact other shoreline areas or existing or potential rare species habitat.

- Prohibit collection of fossils or other materials exposed as the cliffs erode. Any exception to this policy such as collection for research or educational purposes would require environmental review by DNR and issuance of a permit.

HISTORIC AND CULTURAL RESOURCES

Goal: Protect historic structures and cultural artifacts from disturbance.

Management Recommendations:

- In consultation with the Maryland Historic Trust (MHT) and in partnership with Kent County, develop plans to restore the historic home on the property in a manner consistent with its origins as an early twentieth century example of Arts and Crafts/bungalow style of architecture, utilizing the existing structure with as few modifications as possible. Maintain original features and appearance of the large main room on the lower level.

Limit alterations of room arrangement to portions of the upper level (in consultation with MHT.)

- Secure the lodge both before and after renovation to reduce vandalism. Maintain the exterior of the remaining outbuildings to retain their historic facade.

- Facilitate review of the renovation of the historic Knock's Folly curatorship property by the Maryland Historic Trust. Although this property is not available for public use, as a State-owned historic property it is subject to the requirements of Maryland Historic Preservation Law and renovation plans should be made available for review and comment by MHT.

- Protect Native American or other historical artifacts found on site and the soil structure where artifacts may occur. Consult the Maryland Historical Trust prior to any construction or excavation on the NRMA to determine any measures recommended for the protection of potential artifacts in the area of impact prior to soil disturbance.

- As required by regulation, prohibit collection of historical or archeological artifacts. Permission for collection (e.g. for research purposes or educational display) is allowed by permit only, and permit applications should be reviewed by a DNR interdisciplinary team and the Maryland Historical Trust. Include this policy in brochures and maps of the site that are distributed to NRMA visitors. Visitors may take only photos!

- In cooperation with educational institutions and the Maryland Historical Trust, develop an education program to interpret and foster appreciation for the history of the site.

OTHER MANAGEMENT STRATEGIES

Goal: Provide visitors with information needed to experience a visit that is safe, enjoyable, and sensitive to the stewardship needs of the site.

Management Recommendations:

- Provide trails and signs directing visitors to safe shoreline access points. Existing safe access areas include the shoreline at the northern end of the Day Use area, just west of the tidal pond.

  Other areas where it may be desirable to provide access include the beach fronting the marsh near the west end of the Day Use area, and the long sand spit protecting the tidal pond at the east end of the property. Consider developing walking paths and boardwalks down through the swales to the marsh and beach in these areas.

- Provide fencing and signs at dangerous locations to protect visitors by keeping them a safe distance from steep, eroding cliffs. It is recommended that fencing be installed at

least 50 ft., and preferably 100 ft., from the top edge of the steep bank. This includes a margin of safety should there be a sudden tree loss in the vicinity of a hiker. In addition, fences set back from the cliff top won't need to be reinstalled as frequently when trees at the top of the bank fall, creating wide holes where the root system used to be.

- Evaluate the safety of existing trails near the steep cliffs. Portions of the existing trail leading from the lodge to the shoreline close to the cliffs may need to be relocated or closed to visitors.

- Provide a sign at the entrance to the NRMA and parking areas warning of the presence of steep cliffs and offshore currents. Provide signs at major shoreline areas and access points to warn of dangerous currents near shore and to discourage swimming.

- Educate visitors by identifying hazardous areas in brochures and maps, recommending safety measures visitors can take. Examples include warnings to stay away from edge of steep cliffs, to avoid the beach below cliffs after heavy rains and during high winds, and to ensure that children are accompanied by adults.

- With assistance from the Wildlife and Heritage Service, consider providing signs explaining the importance of sensitive areas, the natural history of species being protected, and what human activities are NOT conducive to their protection. Evaluate the optimal locations for such signs and the benefits and potential risks associated with making the visitor aware of the location of sensitive species and features.

- Work closely with the Natural Resources Police to educate visitors and enforce safety and other regulations.

EDUCATION & RECREATION RECOMMENDATIONS

Goal: Provide diverse, high quality, natural resource-based education and recreation opportunities for the public, consistent with resource protection and management goals.

Once the first phase of improvements are complete and safety features to protect unwary visitors from the steep cliffs are installed, a significant increase in all categories of visitor use is anticipated, especially family outings such as picnicking, hiking, etc. When proposed phase II improvements are implemented, visitation will increase further, including school classes and other large groups. The following recommendations are offered to improve education and recreation opportunities for the public.

Management Recommendations:

- In cooperation with interested partners such as Kent County, non-governmental organizations, etc., develop a plan for use of the historic lodge as an educational facility once renovations are complete. Develop displays, research and educational materials, and work areas to allow school groups, families and other visitors to explore topics such as the history, biology, geology and land use management of the NRMA and the region.

- In cooperation with staff from various units of DNR and with interested partners, develop a strong interpretive program to educate children, families, groups and individuals about conservation, ecology, and history at Sassafras NRMA. Make use of both the indoor Nature Center facility at the historic lodge, and the rich outdoor laboratory at Sassafras NRMA. Include topics such as but not limited to:

    - forest ecology and management topics such as succession, decomposition and nutrient cycling, soil formation, the importance of coarse woody debris and standing dead trees, tree identification, riparian forest buffers, etc.;

    - wetlands ecology and aquatic plants;

    - the ecology and geology of eroding cliffs - the processes of weathering, erosion, and sedimentation; the formation of beaches and cliffs; plants and animals found in this habitat; fossils, concretions, and greensand, etc. (approach Maryland Geological Survey as a potential partner);

    - erosion and soil conservation (e.g. identify field edge erosion and show how it enters the woods);

    - birds at Sassafras -- biology, habitat needs and conservation of forest interior dwelling species, grassland birds, and waterfowl;

- biodiversity and the importance of native species and habitats;

- rare, threatened and endangered species (including examples from Sassafras), protection strategies, and the biology of rarity;

- noxious weeds and invasive exotic species and their control;

- regional history of agriculture, fishing, hunting and other natural resource uses of the area;

- historical use of the area by native Americans, and their artifacts (with input from the Maryland Historical Trust);

- history of architecture in the region (with input from the Maryland Historical Trust); and

- ecology of the Chesapeake Bay and its tributaries (with various partners including the National Park Service Gateways Program).

- Pursue possible partnerships with the Kent County Farm museum and with NRCS to develop educational programs concerning agriculture, including agricultural history and current best management practices for soil conservation, nutrient management, and wildlife, etc.

- Resource planning staff along with various DNR resource professionals will develop a system of designated recreational trails. The trail system should be designed to enhance the visitor experience by making the site more accessible, and to protect the resource by guiding visitors toward routes that can sustain regular use without damage.
- Involve other DNR resource professionals to determine which trails can sustain multiple-use and which may require use limitations.

- Evaluate the potential for a trail that would connect the NRMA to the County park, including the feasibility of constructing a boardwalk through the intervening marsh. Seek partnerships to design and fund such trails. Consider trails and boardwalks to provide access to the sand spit east of the tidal pond and to the marsh and beach west of the lodge (in the low stretch of shoreline between the two high banks).

- When designing and building trails, strive to protect resources and limit erosion. For example, use water bars where needed. Evaluate the condition of existing trails and their impacts on the surrounding landscape, and consider plans to improve or relocate any trails with serious erosion or other problems.

- In cooperation with other DNR units and other interested partners seek funds to develop additional infrastructure to promote visitor enjoyment and understanding of the natural resources at Sassafras. For example, maintain or improve the bird watching platform at

the tidal marsh, and consider building a canopy observation platform in the forest to put children "up in the tree tops" (similar to the platform at Horn Point), and/or a tower in the day use area to offer views of the tidal marsh and the Sassafras River.

- In cooperation with the Wildlife and Heritage Service, provide for recreational hunting at Sassafras:

  - Continue the existing managed hunting program throughout most of the site during Interim Use period.

  - When development of Phase I recreational facilities is complete, develop a hunting plan that preserves recreational hunting in the Multi-Use Area and perhaps in some other areas as compatible with other recreational uses.

  - Through recreational hunting, maintain a deer population at a level that is in balance with its habitat and with other land management and recreational activities.

  - Evaluate hunting and trapping opportunities for waterfowl, dove, squirrel, turkey, upland game, and furbearers.

  - Re-evaluate the hunting program as Phase II developments are implemented, and expand or contract based on levels and types of visitor use, success of limited hunting program, potential user conflicts, etc.

- In cooperation with the Wildlife and Heritage Service, develop facilities and programs to promote wildlife appreciation activities, such as bird watching blinds, nest boxes, bluebird trails, educational programs, etc. Consider and seek funding for a platform to view the eagle's nest from a safe distance, or other bird viewing structures.

- Continue and expand the group primitive camping program, and integrate it with educational and recreational programs.

- Develop a service-learning program at Sassafras whereby scout groups, school groups and others can contribute community service and learn about conservation at the same time. For example, students may hear a short presentation or examine specimens at the Nature Center and then assist in a project to plant a riparian buffer, remove invasive water chestnuts from the tidal pond, clean up an area of shoreline, maintain trails, or etc.

- In cooperation with other DNR programs, look for opportunities to expand existing state outreach programs to the Sassafras site, for example: Project Wild, Scales and Tales, Wild Acres, Hooked on Fishing, State Forest and Park Service Outdoor Discovery summer camps, etc.

- Pursue partnerships with local educational institutions such as Washington College and Echo Hill Outdoor Center for educational programs at Sassafras NRMA.

- Develop a network of volunteer and community groups programs interested in developing cooperative programs at Sassafras such as clean-up days, demonstration gardens, etc.

- Design all recreational and educational programs at Sassafras NRMA to protect and conserve the special natural resources of Sassafras NRMA.

- Follow Americans with Disabilities Act (ADA) guidelines in the design of recreation facilities. To the extent possible, make programs and facilities handicapped-accessible. Identify a portion of the trail network to provide ADA accessibility, including scenic viewpoints and if possible, shoreline access.

- Within the constraints imposed by responsible resource protection, provide a location for compatible community and special events, especially those related to or dependent upon the natural resources available at Sassafras.

- Support the creation of "Friends of Sassafras" group to assist the Park Manager in carrying out the general objectives of the Plan and various activities (to be identified later) at the NRMA.

- Establish a working group of citizens, county staff, and DNR professionals to draft a detailed site plan for the Day Use Area, the Multi Use Area, and the Natural Area, of the NRMA.

- Explore the possibility of identifying specific areas for waterfowl hunting.

- Clearly identify multi use trails that support horseback riding. All other trails will be off-limits for this particular activity.

FUNDING RECOMMENDATIONS

Goal: Obtain adequate funding and staffing to pursue the goals and recommendations outlined above to protect and enhance resources and provide high quality public education and recreation opportunities at Sassafras NRMA.

Recommendations:

- Seek full funding of proposed facilities through the annual Capital Budget request process (see Appendix II). Over the long-term, consider the potential need for additional capital improvements to be requested in future years.

- Seek needed operating funds for required start-up equipment, ongoing maintenance, management and administrative activities, and adequate permanent and seasonal staffing (see Appendix V).

- Pursue mutual objectives with Kent County, educational institutions, and other interested organizations to achieve financial as well as operational partnerships.

- Responsibility for funding of objectives at Sassafras related to the goals of various units and programs within DNR must be shared by those units.

  For example, any reductions in area being farmed to achieve wildlife management objectives will reduce prior income and available budget for operations at Sassafras. Accordingly, assistance will be needed from the Wildlife and Heritage Service to identify and secure sources of funding to compensate for the lost revenues, either through general state funds, targeted grant or incentive programs, or other sources.

- Through the regional team and other contacts within DNR and outside, request assistance in identifying and seeking additional potential sources of potential funding.

- Pursue grants from sources like the Chesapeake Bay Trust and the National Park Service Chesapeake Gateways Program to help implement recommendations of the plan.

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